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Essays on Mergers and Acquisitions and Governance

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ABSTRACT

There is a recent strand of corporate finance literature that explores the impact of executives and directors' social connections on firm value, performance, and governance. Those studies document that such social connections could be beneficial when they enhance the sharing of information and knowledge, but could also be detrimental when associated with CEOs, as they could provide the CEO with a source of influence that makes her more entrenched and powerful.

In the first essay, I use four common measures of network centrality to compute the position of the CEO within the social network of all executives and directors of US public companies. This differentiates this study from previous research as it focuses on the overall connectedness of CEOs rather than studying the effect of bilateral social connections across executives, directors, or firms. Furthermore, I investigate the determinants of such CEO network centrality. I find that graduating from an "elite" university, having a prior career path in a publicly listed firm, serving on the board of directors of other S&P firms, and being successful in the past career path positively increases a CEO's position in the social network. However, spending a longer period of time in the career prior to holding the CEO position, and being more optimistic decreases the CEO's position in the social network. Finally, I investigate the impact of such CEO network centrality on the firm's overall valuation, performance, and CEO compensation. I find that increases in CEO network centrality after holding the CEO position increases the firm's value when measured by market to book ratio, doesn't significantly increase the firm's accounting performance when measured by ROA, and significantly increases the CEO's compensation.

In the second essay, I examine the impact of CEO network centrality on M&As which are considered to be one of the most important events that adversely impact the value of firms, and in which the CEO plays a crucial role in exploiting any power that she could have as a result of

her influential central position in the social network. I find that in the specific context of M&A's, higher CEO network centrality increases the frequency of mergers, and not only creates losses to the acquirer shareholders but also decreases total expected synergies. This evidence is consistent with the managerial entrenchment hypothesis; more centrally positioned bidder CEOs are insulated from both the disciplinary market for corporate control and the executive managerial labor market.

Finally, in the third essay, I study the M&A's from a different angle, to examine how external governance acts when the internal governance fails to act. Shareholder activism is an excellent area to do such investigation, as numerous studies document evidence regarding the relevance of shareholder activism to internal governance, but only a few studies explore the impact of shareholder activism on external governance. I find that shareholder activism, measured by the presence of shareholder proposals, shareholder votes in favor of a proposal, and the participation of shareholders in voting on the proposal, significantly increases the probability of a firm becoming a target of a subsequent completed acquisition. At the same time, target companies with previous shareholder proposals earn significantly less cumulative abnormal returns around the merger announcement compared to targets with no proposals. One potential channel that facilitates such functioning of the market for corporate control when internal governance fails to act is the common share ownership. I find the highest effect of takeover probability when the proposal sponsors in the target firm are also owners in the bidder firm.

This dissertation is approved for recommendation
to the Graduate Council.

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DEDICATION

To my Dad’s soul, my loving Mom, my special husband, and my adorable child

TABLE OF CONTENTS

I. INTRODUCTION

During the past decades, a vast amount of research in the corporate governance field has been conducted to explain the famous agency problem, and to suggest ways to mitigate such problem. One important line of literature in that stream investigates mechanisms that help improve the governance of firms and reduce the conflict of interest between the management and the shareholders. Those mechanisms are either through improved monitoring from independent boards (see for example Gordon, 2007), institutional holders (see for example La Porta, Lopez-de-Silanes, and Shleifer, 1999), activist shareholders (see for example Gillan and Starks, 2000), or by alignment of executives' and shareholders' interests through incentive compensation arrangements(see for example Murphy, 1999). The other line of research deals with examining the consequences of such agency problem and poor governance. Those consequences include increased levels of executive compensation (see for example Bebchuk and Fried, 2004), suboptimal investment and merger decisions (see for example Masulis et al., 2007), and significant managerial power and entrenchment that results in overall shareholder value destruction(see for example Bebchuk et al., 2009).

However, in the recent years, an emerging line of research discovers that there has been another element missing from all those previous studies, and which is important in understanding and resolving any agency or governance problems. This missing element is the existence and importance of social connections across executives and directors. In order to have effective monitoring through directors, institutional holders, or even activist shareholders, there is a critical need for information. How executives, directors, and shareholders receive and utilize information advantages depends to a great degree on the social connections among them. Indeed,

several researchers have provided evidence on how social connections impact board monitoring (for example Coles et al., 2010; Fracassi and Tate, 2012), executive compensation and turnover performance sensitivity (for example Hwang and Kim, 2009; Engelberg et al., 2009), mutual funds and venture capitals (for example Cohen et al., 2008; Hochberg at al., 2007), and corporate takeovers (for example Cai and Sevillier, 2012; Ishii and Xuan, 2010).

In my dissertation, I also focus on the impact of social networks on firm's valuation, performance, executive compensation, and merger outcomes. However my study is different in that I focus on the CEO's overall connectedness to all directors and executives of US public firms, rather than studying bilateral social connections between executives and directors within a firm or across firms. Moreover, to document the importance of information in the world of corporate governance, I also study the impact of shareholder activism on mergers and acquisitions to investigate how the external market for corporate control acts when there are internal governance problems. I find that information channels do facilitate the functioning of the market for corporate control when internal governance fails, and this mechanism acts through share cross-ownerships of shareholder proposal sponsors in target and bidder firms.

II. CEO NETWORK CENTRALITY

Abstract: I use data about prior and current employment of all directors and executives of US public firms as reported in BoardEx to construct social networks and compute four common measures of CEO network centrality: Closeness, Degree, Betweenness, and Eigenvector. Furthermore, I utilize the data provided in BoardEx on past education, career path, and board memberships in listed, unlisted and other non-profit organizations, along with S&P 1500 board membership data, compensation data, and data representing the personal traits of CEOs, to explain the determinants of CEO network centrality. I find that graduating from an Ivy League university, working in a publicly listed firm, serving on public or S&P 1500 boards, and being successful in the prior career path increases CEO network centrality. In contrast, staying in the career for a long time before getting appointed as a CEO, being overconfident, and being optimistic, decreases CEO network centrality. After understanding the sources of CEO network centrality, I examine the impact of CEO network centrality on firm's market to book ratio, ROA, and CEO's compensation. I report that higher CEO network centrality is associated with higher market to book ratio but insignificantly higher ROA. These results support the theory that predicts positive benefits from CEO network centrality due to enhancement of information sharing and access to private information. However, I also document a positive relationship between CEO network centrality and CEO's total compensation, equity compensation, and the CEO pay slice. This positive relationship could be attributed to the benefits of information advantages gained by the CEO, or to the entrenchment effects that result from the CEO's power due to her central position in the social network.

1. Introduction

A recent stream of research is emerging in the corporate finance literature related to studying the impact of different kinds of social connections across executives and directors of US public firms on the firm's governance, policies, and performance. Those studies document evidence that supports the relevance and significance of such social connections in explaining firm's practices and corporate decisions, but there is mixed evidence on whether such social connections are beneficial or destructive. For example, there are studies that show how social connections between the CEO and directors of the same firm tend to weaken board monitoring (Fracassi and Tate 2012). Other studies show how CEO-director connections results in higher CEO compensation, lower pay-performance sensitivity and lower turnover performance sensitivity (Hwang and Kim 2009; Coles et al. 2010). On the other hand, there are studies that highlight the benefits of socially connected firms in facilitating information flow and how those benefits are translated to higher stock returns and improved accounting performance (Fracassi 2009; Larcker, So, and Wang 2010), reductions in costs of borrowing and improvements in credit rating (Engelberg et al. 2011), better fund performance in venture capitals (Hochberg et al. 2007) or mutual funds (Cohen et al. 2008), and better merger performance (Cai and Sevillier 2012; Schonlau and Singh 2009).[1]

In this line of literature, several methods have been used to examine the influence of social connections (for example if there are common directorships, education ties, employment ties,

[1] There are studies that document the negative impact of social connections on merger performance, for example, Ishii and Xuan (2010) show that when the acquirer and target are socially connected, this results in value destroying acquisitions. El-Khatib, Fogel, and Jandik (2012) document that higher acquirer CEO network centrality is associated with lower acquirer returns, and reduced total synergies.

and memberships in social clubs), but in all of those papers, the emphasis is on the bilateral connections between the CEO and directors in one firm or across different firms. I utilize measures of the CEO's overall connectedness to all other executives and directors of US public firms. Those measures of CEO network centrality represent the CEO's position in the social network of all other executives and directors**.** Hence, I begin by creating a social network of all US public executives and directors based on their common prior and current employment, and then calculate four measures of network centrality that are commonly used in the social networks literature; Degree Centrality, Closeness Centrality, Betweenness Centrality, and Eigenvector centrality. Using those measures, I not only focus on the size of the CEO's social network through the number of social connections she has (Degree), but I also capture the importance of the CEO's position in the social network by looking at how efficiently she gets information from the network (Closeness), how she can control the information flow across other members in the network (Betweenness), and how she is connected to other important members in the network (Eigenvector).

Social science studies consider centrality as a source of power (e.g. Mizruchi and Potts 1998; Brass and Burkhardt 1992; Padgett and Ansell 1993), yet there is limited knowledge on the sources of such power. Therefore the objectives of my paper include first understanding the determinants of CEO network centrality, and then investigating the impact of CEO network centrality on market valuation, firm accounting performance, and CEO compensation.

From prior literature on social connections, it is reasonable to assume that education and work experiences impact the social connectedness of individuals. Hence my first hypothesis towards finding determinants of CEO network centrality is associated with the assumption that the career

path of the CEO prior to becoming a CEO significantly determines CEO network centrality. I measure career path by including proxies for: the degree of social elitism of the university or college attended during undergraduate and graduate education; whether the CEO had experience in a publicly listed firm; whether the CEO had experience in any S&P 1500 firm; the total number of years of experience in any listed or S&P 1500 firm; if the CEO served on public, private, or non-profit boards; if the CEO served on important boards indicated by being S&P 1500 boards; and finally as a measure of the overall success of the CEO in her career path I use the first full year salary for her as CEO.

In addition to career path, personal characteristics can impact the social connectedness of individuals and thus be a significant determinant of CEO network centrality. A recent strand of literature examines the impact of CEO personal characteristics on managerial decisions and CEO compensation.[2] Hence, in addition to CEO age, I utilize two of those common measures; CEO overconfidence and CEO optimism, to study how those personal traits could influence CEO network centrality. CEO overconfidence and CEO optimism are both related to CEO's overestimation of either stock returns (overconfidence as in Malmendier and Tate 2005, 2008, 2011) or overestimation of earnings forecasts (Otto 2012). Because a central CEO will be exchanging information and receiving feedback from her social peers and members of the social network, I assume that overconfident or optimistic individuals will not be communicating as frequently as others, thus reducing their CEO network centrality. Consequently, my second hypothesis follows that age will increase CEO network centrality while overconfidence and optimism will decrease CEO network centrality.

[2] See for example Malmandier and Tate (2005, 2008, 2011); Campbell et al.(2011); Otto (2012)

CEO network centrality can increase the market valuation and accounting performance of the firm if the CEO leverages the private information that she receives from the social network of executives and directors (see for example Freeman 1979; Tsai 2001; Cohen et al. 2008 on the benefits of network centrality through facilitation of information exchange). But it can also decrease market valuation and the accounting performance of the firm if the CEO becomes powerful and entrenched due to her central position in the social network and if she exploits such power to maximize her own wealth objectives by making poor managerial decisions that could be detrimental to the shareholders (see for example Bebchuck et al. 2011 on how CEO power destroys value). Hence the effect of CEO network centrality on market valuation is an empirical matter, and my third hypothesis is related to whether higher CEO network centrality increases or decreases firm's market valuation and accounting performance. Furthermore, following the same logic used to formulate hypothesis 3, CEO compensation is expected to increase with higher levels of CEO network centrality. However, CEO compensation can increase due to the positive benefits of CEO network centrality, or due to the negative entrenchment effects of the CEO that are present in an environment of poor monitoring and governance. I will not attempt to disentangle those two effects in this study, but I study the general effect of CEO network centrality on CEO compensation and assume in my fourth hypothesis that there is a positive relationship between CEO network centrality and CEO compensation.

Utilizing data from BoardEx to construct social networks of all publicly listed firms' executives and directors, I compute the CEO network centrality for all S&P 1500 CEOs who started their jobs as CEOs during or after 1997, and then estimate the determinants of CEO network centrality using a cross section of 3012 CEOs. I find that attending an Ivy League university, having professional experience in a publicly listed firm, having professional

experience in S&P 1500 firm, serving on a public board, serving on S&P 1500 board, and receiving a higher salary from the first CEO job, significantly increases the CEO network centrality. However, being overconfident or optimistic significantly decreases the CEO network centrality.

To study the impact of CEO network centrality on the firm's valuation, accounting performance, and CEO compensation, I conduct panel OLS regressions with robust standard errors that are clustered at the firm, representing all S&P 1500 CEOs during the period 2000-2009. Those panels are restricted to include years where the CEO acts in full, and CEOs who are the same in the following year. To deal with the possible endogeneity between CEO network centrality and measure's of firm valuation, accounting performance, and CEO compensation, I use the cross section models of CEO determinants to predict the CEO network centrality before the CEO starts the CEO position, and then control for this predicted CEO network centrality in the panel regressions. Using data on 3230 different S&P 1500 CEOs in 2130 firms and 13082 firm year observations, I find the following patterns: First, higher CEO network centrality is associated with higher firm valuation measured by Tobin's Q. This relationship remains significant even after controlling for predicted CEO network centrality based on the CEO determinants before she starts the CEO job, and after controlling for variables measuring effective governance like intensive monitoring boards, small board of directors, separation of the CEO and Chairman positions, low entrenchment measured by Bebchuck, Cremer, and Peyer's (2009) entrenchment index, and presence of block ownership. Second, higher CEO network centrality is associated with better firm accounting performance measured by ROA. This relationship is no longer significant after controlling for predicted CEO network centrality, but the predicted CEO network centrality itself is positively and significantly associated with better

accounting performance. This could be a result of the delays in accounting measures to incorporate relevant and valuable information. Third, higher CEO network centrality is associated with higher CEO compensation measured by total or incentive compensation. Moreover, higher CEO network centrality results in the CEO receiving a higher proportion of the overall compensation paid to the five top executives in the firm. Finally, higher CEO network centrality results in lower sensitivity of the CEO's pay to firm's performance.

The paper proceeds as follows: In section 2 I discuss the CEO network centrality measures and formulate the key hypothesis. Section 3 describes the data sources and sample construction. Section 4 presents the empirical tests and results. Section 5 concludes.

2. CEO Network Centrality

2.1. The Measures of CEO Network Centrality

I develop a social network based on all common prior and current employment connections between the CEOs and all other executives and directors of publicly listed firms. Then I construct four common measures of CEO network centrality: Degree, Closeness, Betweenness, and Eigenvector (Proctor and Loomis 1951; Sabidussi 1966; Freeman 1977; Bonacich 1972). Degree simply reflects the size of the CEO's social network. It represents the number of direct social relationships the CEO has within the social network. Having a higher Degree implies that the CEO has a wider access to other executives and directors within the network, and hence she is considered to be more popular in the social network. The three other measures, Closeness, Betweenness, and Eigenvector consider the importance of the CEO's position in the social network. Those measures capture more of the power and the influence that the CEO gains through her central position within the social network, and those are the measures that highlight

the significance of using centrality measures to present the CEO's overall connectedness to all other executives and directors, compared to simply relying on the number of bilateral social connections as done in the previous research. Closeness represents how easily a CEO can reach other executives and directors within the social network. It is measured by the inverse of the sum of shortest path between the CEO and all other executives and directors in the network. Betweenness measures the control over information flow that the CEO has in the network when she lies on the shortest path between other executives and directors of the network. Hence Betweenness indicates that two other members of the social network will not be able to communicate unless they go through the CEO. Finally, Eigenvector not only measures the number of relationships that the CEO has in the network as in Degree, but also shows how important the CEO is with respect to how important his connections are.

2.2 The Determinants of CEO Network Centrality

2.2.1 CEO Career Path as Determinants of CEO Network Centrality

It is generally assumed that elite college attendees are more successful across their careers (Brand and Halaby, 2005). Moreover, common education ties play an important role in information transfer and sharing.[3] Hence, it is reasonable to assume that attending an elite college will significantly impact the centrality of the CEO within the social network. In addition, a CEO could achieve a high position in the social network of business leaders through her long experience in the business world which enables her to develop numerous and important social

[3] Cohen et al. (2010) show that security analysts that share an educational link with the company achieve significant premiums associated with their stock recommendations. Shue (2011) reports that CEOs' compensation increase to match with their peers after attending alumni social events at Harvard. Chidambaran, Kedia, and Prabhala (2010) document that social connections formed by education ties between CEO and board members significantly increase the probability of committing fraud.

connections. [4] However, one might expect that the more central individuals will get appointed to a CEO position faster than the less central individuals. Thus to investigate the impact of the past career path of the CEO prior to becoming a CEO, I use the information about her past job experience to indicate whether she had experience in a publicly listed firm or an unlisted private firm, in addition to the total number of years worked prior to becoming a CEO, if she ever worked in any S&P 1500 firm, and the total number of years worked in the S&P 1500 firm. Furthermore, multitasking in board positions at many firms can improve one's network connections and network centrality. Thus, I investigate whether sitting on publicly listed boards, private firms, and other non-profit organizations impact the CEO network centrality, and I capture the importance of the board positions by specifically examining whether the CEO served as a member on any S&P 1500 boards. Finally, I use the first full year salary for the CEO on the job as an overall measure of the success of her past career path.[5] Consequently, the first alternative hypothesis tested in my study is:

H1: A successful career path measured by attending an elite university, the prior work experience at a public or S&P 1500 firm, the number and type of boards that the CEO sits on, and the first salary on the CEO job, significantly increases the CEO network centrality.

2.2.2 CEO Personal Characteristics as Determinants of CEO Network Centrality

A CEO's network position depends on the size and importance of her social connections which will ultimately be influenced by her personal characteristics and her ability to connect to others within the social network. Thus I expect that the CEO's age will significantly help in

[4] Kaplan, Martel, and Stromberg (2004) suggest that work experience could be one possible explanation for how venture capital networking improves the performance of the firms.
[5] Engelberg et al. (2009) suggest that the value created through the CEO's social network should be reflected in her compensation

gaining CEO centrality because the older the CEO, the more connections the CEO will have due to her long experience and time spent in the business world.

Malmendier and Tate (2005, 2008, and 2011) argue that overconfidence which arises from personal traits cause CEOs to overestimate the means of returns to their investment projects. They measure overconfidence by examining the option exercise decisions of CEOs. Overconfident CEOs tend to hold their highly in-the-money vested options rather than optimally sell them. Moreover, Otto (2012) documents that optimism in CEOs, which is also due to personal characteristics, drives CEOs to overestimate the value of their compensation claims that depend on positive outcomes. Those CEOs are more likely to release earnings forecasts that are higher from the analysts' forecasts, and Otto (2012) uses this as a proxy for the CEO's optimism. A central CEO will be able to communicate with other members of the social network and will be able to discuss her decisions, which could provide the CEO with feedback and peer opinions that keep her informed and thus minimizes the possibility of overestimating returns to a project or earnings forecasts. Similarly, an overconfident or optimistic CEO may be reluctant to frequently connect with other executives and directors due to her own beliefs on how she expects to outperform the market, and hence her unwillingness to hear the other executives' and directors' more conservative opinions. Consequently, the second alternative hypothesis in my study is:

H2: Personal characteristics will significantly determine the position of the CEO in the social network. An older CEO will gain higher CEO centrality position, while an overconfident or optimistic CEO will gain lower CEO centrality position.

2.3 The Effect of CEO Network Centrality on Firm Valuation and Accounting Performance

Numerous studies report the positive role of firm or board network centrality in facilitating the access to and sharing of information about the general market and industry, and in reducing the information asymmetry across different connected parties within the social network.[6] This enhancement in information flow will result in better managerial and corporate decisions, and hence will translate into better firm economic performance and higher market value.[7] Thus, CEO network centrality could enhance the value of the firm and its accounting performance if the CEO leverages those information advantages that she gains from her central position in the social network.

On the other hand, being central in a social network could lead to gaining more power and influence (Mizruchi and Potts 1998; Brass and Burkhardt 1992), which could cause her to become more entrenched, and hence, adversely impact the quality of her corporate decisions (see for example Bebchuk et al. 2011; Masulis et al. 2007).[8] Such evidence of value destruction and poorer board monitoring has been documented in previous research that studies the impact of

[6] Freeman (1979) and Tsai (2001) show how the importance of central positions in a network helps gain better access to information and knowledge transfer. Cohen, Frazzini, and Malloy (2008) suggest that personal connections facilitate the information exchange among investment professionals.

[7] Larcker, So, and Wang (2010) find improved economic performance in terms of higher stock returns and ROA when the board of the firm is highly central. Fracassi (2009) also supports the evidence of better accounting performance of highly central firms. Engelberg, Gao, and Parsons (2011) document that social connections between firms and their lenders provides positive benefits in terms of reduced borrowing costs, improved credit ratings, and higher stock returns. Cai and Sevilir (2012) show that social connections across acquirers and targets in M&A's reduces information asymmetries and hence results in better merger performance.

[8] There could be other negative effects associated with information diffusion, for example Bizjak, Lemmon, and Whitby (2009) document negative impacts of board interlocks through the spread of bad practices such as options backdating.

director centrality or CEO-director within firm social connections on firm's policies and governance (see for example Fracassi and Tate 2012; Hwang and Kim 2009; Barnea and Guedj 2009).

Ultimately, whether CEO network centrality creates or destroys the value of the firm, and improves or adversely impacts the accounting performance is an empirical matter, and my third hypothesis is as follows: [9]

H3: CEO network centrality will significantly impact the value of the firm and its accounting performance:

H3a- Increases in CEO network centrality will increase the value of the firm and its accounting performance

H3b- Increases in CEO network centrality will decrease the value of the firm and its accounting performance

2.4 CEO Network Centrality and CEO Compensation

Based on the information advantage that the CEO possesses due to her central position in the social network and her ability to leverage such private information, it is reasonable to expect that increases in CEO network centrality will be accompanied by increases in CEO compensation. In fact, Engelberg et al. (2009) and Liu (2010) document such positive relation between the effect

[9] Another reason why the accounting performance may decline could be due to the busyness of the central CEO in serving on other boards or performing other non-profitable and social activities. See for example, Fich and Shivdasani (2006); Core et al. (1999) on how busy board members adversely impact the performance of their firms. However, Field et al. (2011) argue that busy directors can add value to young firms.

of social connections and compensation, and they explain that it doesn't necessarily indicate that such increases in CEO compensation are attributed to poorer governance.

However, other researchers (for example Bebchuk et al. 2011) suggest that increases in CEO compensation when the CEO is viewed as powerful or influential, is due to the CEO's entrenchment.[10] In both cases, whether the reason behind the increase in CEO compensation is justifiable due to her skills, information advantage and improved performance, or unjustifiable because it only represents the power and influential effects of the CEO that causes her to become more entrenched, I expect that increases in CEO network centrality will be accompanied by positive increases in CEO total compensation. Consequently, my fourth alternative hypothesis follows as: [11]

H4: Increases in CEO network centrality are associated with increases in CEO total compensation.

3. **Data Sources and Sample Construction**

I use BoardEx to obtain information about the common prior and current employment connections between CEOs and all executives and directors of US public firms to create the social network based upon which I compute the four CEO network centrality measures as explained in section 2.1. This network of public companies contains 12 million links formed in the period spanning from 1938 to 2010. The CEO network centrality measures are computed starting from 1996 to 2010. Then in each year, I compute percentile rankings based on the entire

[10] Bebchuk et al. (2011) measure CEO power by calculating the ratio of CEO compensation to the compensation of the highest 5 paid executives in the firm.
[11] In this study I do not attempt to show whether the positive relationship between CEO network centrality and compensation is due to information advantages or entrenchment.

network, but I only focus on S&P 1500 CEOs in my study due to the necessity of merging the data with other data sets that only covers S&P 1500 firms (for example Risk Metrics and Execucomp).

In the cross section models of determining CEO centrality, I only study CEOs who started their position as a CEO in S&P 1500 firms during or after 1997. This restriction is due to the availability of data for computing centrality measures from 1996. In those models, I use BoardEx to gather information about the graduate education of those CEOs, their education experience prior to becoming a CEO in either public or private firms, and if they ever served on public, private, or other (non-profitable) boards. I also use Risk Metrics to search for whether the CEOs sat on other S&P 1500 firm boards. Another restriction in such cross section models of determining CEO centrality is to keep the CEO's first S&P 1500 job, i.e. if the CEO moves to another CEO position during the sample period, I only keep the first CEO position. Finally I use Execucomp to get data about the first full year salary on the CEO job. This cross section analysis contains data about 3033 different CEOs in 1964 firms.

In panel regressions where I study the impact of CEO centrality on firm value, accounting performance, and CEO compensation, I utilize the sample of all S&P 1500 CEOs during the period spanning from 2000-2009, and I use Compustat to get the firms' financial data. I also restrict the sample to only include years when the CEO acted in full, and when the CEO remained the same in the next year, due to the necessity of using time lags in the models. My final sample used in those panel regressions consist of 3230 different S&P 1500 CEOs, in 2130 firms, and 13082 firm year observations. Table 1 displays statistics on the centrality variables, and other key financial and compensation variables that are available for those 13082 firm year

observations. It is noticeable that S&P 1500 CEOs are considered highly central in the network of all US publicly listed executives and directors. The median of CEO network centrality when expressed in percentiles is 73, 79, 84, and 78 when using Closeness, Degree, Betweenness, and Eigenvector as measures of CEO Network centrality, respectively. Furthermore, the 25th percentile is about 59 and the 75th percentile is about 91.

4. Empirical Evidence

4.1 Determinants of CEO Network Centrality

4.1.1 Career Path

To test the first hypothesis related to the impact of CEO career path on determining CEO network centrality, I run cross section regressions of CEOs, where the dependent variable is the CEO's centrality, and the independent variables include measures of CEO prior career path. Those cross sections include CEOs who started their job as CEOs in S&P 1500 firms during or after 1997. If the CEO switched her job during the sample period to another S&P 1500 firm, I only keep the first time she became a CEO. All independent variables are measured one year before the CEO started her first job. The results of this model are presented in Table 2. CEO network centrality is measured by Closeness in panel A, Degree in panel B, Betweenness in panel C, and Eigenvector in panel D. In each of the models 1 – 8, I study the effect of each of the elements of the prior career path individually on CEO network centrality, and then in model 9, I include all the elements together. In column 1, I include the variable *Elite* as a measure of the prestigious status of the university or college that the CEO attended during undergraduate and graduate studies. *Elite* is a dummy variable that equals 1 if the CEO attended one of the Ivy

League universities and zero otherwise.[12] Using all measures of centrality, *Elite* is highly significant and positive i.e. if the CEO attended one of those Elite schools, then she will have higher centrality in the social network. In model 2, I include the variable *Listed Work Experience*, which is a dummy that equals 1 if the CEO had prior work experience in any publicly listed firm and zero otherwise, and I include the variable *Yrs Work Experience* which is a variable that presents the total number of years of experience in the listed firm. Using all centrality measures, *Listed Work Experience* is positive and significant, while *Yrs Work Experience* is negative and significant. This suggests that having experience in a publicly listed firm indeed increases the possibility of developing social connections with other executives and directors of public firms, hence will increase the centrality of the CEO in the social network. But the longer it takes for this individual to start her first job as a CEO, the less socially connected this individual could be. To measure the relative importance of the past job experience, in column 3, I include the variable *S&P Work Experience*, which is a dummy that equals 1 if the CEO had prior work experience in any S&P 1500 firms, and zero otherwise, and *Yrs S&P Work Experience* which is the total number of years worked in S&P 1500 firms prior to becoming a CEO. The results show that having specific S&P 1500 work experience is not so significant in determining CEO centrality (only significant when using Degree in panel B, and Betweenness in panel D), but similar to the results of experience in any listed firm, the longer the time spent in S&P firm before becoming a CEO, the less central the CEO is. In models 4, 5, and 6, I use the variables *Public Board Seats*, *Private Board Seats*, and *Non-Profit Board Seats* to measure the total number of any public, private, and other non-profit boards that the CEO served on. Using

[12] The Ivy League members are: Brown University, Columbia University, Cornell University, Dartmouth College, Harvard University, Princeton University, University of Pennsylvania, and Yale University. http://en.wikipedia.org/wiki/Ivy_League

all centrality measures, serving on more public, private, and non-profit boards, is associated with an increase in CEO network centrality. Furthermore, to measure the importance of the board that the CEO served on before becoming a CEO, I use the dummy variable *S&P Board Seat*, which equals 1 if the CEO served on any S&P 1500 board seat and 0 otherwise, and the variable *Total S&P Board Seats*, to present the total number of other S&P 1500 board seats. Both variables are significant and positive indicating the importance of sitting on S&P 1500 board in determining CEO network centrality. In model 8, I use the variable *Salary* which is the log of the CEO's total compensation for the first full year on the CEO job to measure her overall success in the prior career path. *Salary* is significant and positive in all specifications, indicating that indeed, the success in prior career path increases the CEO's position in the network. Finally, in column 9, I include all the elements of the career path and I find that attending an elite school during education (*Elite*) , having experience in a publicly listed firm (*Listed Work Experience*), serving on the board of a publicly listed firm (*Public Board Seats*), serving on the board of S&P 1500 firms (*S&P Board Seat*), and receiving a high total compensation for the first year acting on the CEO job (*Salary*) are all positive and significant determinants of CEO network centrality. This confirms the first hypothesis; CEO career path significantly determines CEO network centrality. Moreover, the longer the time it takes for the CEO to become a CEO, the less central this CEO is, and this is significant when using Degree, Betweenness and Eigenvector as measures of CEO network centrality.

4.1.2 Personal Characteristics

To test hypothesis 2 regarding the impact of personal characteristics on determining CEO network centrality, I run the same cross section models of CEO network centrality as in 4.1.1,

but I use measures of personal characteristics as independent variables. The results are presented in Table 3. Centrality is measured using Closeness in Panel A, Degree in Panel B, Betweenness in Panel C, and Eigenvector in Panel D. In columns 1–3, I study the impact of each of the personal characteristics separately, and in model 4, I include them all in one specification. In column 1, I use the *Age* of the CEO, one year before she gets appointed as a CEO, and I find that the coefficient is positive using all measures of centrality, and significant in 3 out of 4 measures. In column 2, I follow Campbell et al. (2010) methodology in computing Malmendier and Tate's (2005) measure of CEO overconfidence based on her stock option holding and exercising decisions, and use a dummy variable *M&T Overconfidence* that equals 1 if the CEO is overconfident and zero otherwise. In column 3, I employ Otto's (2012) measure of optimism, which compares the earnings per share that were forecasted by the CEO and the earnings per share that were eventually realized. *Ottos's optimism* represents a fraction of the earnings forecasts that were higher than the actual EPS during the year. This variable takes the value between 0 and 1, where 0 indicates that all EPS forecast were lower than the actual EPS and 1 represents the more optimistic view of earnings forecasts that are higher than the actual EPS. Both measures of overconfidence and optimism are highly significant and negative, providing evidence supporting the second hypothesis. Finally, in column 4, I include all measures of personal characteristics and they remain to be significant with the expected sign (except for *Age* in Panel D, which becomes insignificant when using Eigenvector as a measure of CEO network centrality).

4.1.3 CEO Career and Personal Characteristics

In Table 4, I include the entire career and personal independent measures that were tested separately in Tables 2 and 3 in one model to test for the overall determinants of CEO network centrality. The results are displayed when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality in Columns 1-4, respectively. In this specification, attending an Elite college, having prior experience in a listed firm, serving on the boards of public firms, serving specifically on a board of S&P firm, and having a higher salary indicating an overall more successful prior career, significantly positively increases CEO network centrality. The longer the time spent in the career path working in S&P firms before getting appointed as CEO for S&P 1500 firm, and the more overconfident or optimistic the individual is, the less central she is in the social network of all executives and directors of public US companies.

4.2 The Effect of CEO Network Centrality on Firm Valuation and Accounting Performance

4.2.1 The Effect on Firm Valuation

To examine the effect of CEO network centrality on firm valuation, I use Tobin's Q as a measure of the market valuation and I run the following panel of OLS regressions using robust standard errors that are clustered at the firm level, and including year fixed effects:

$$TQ_t = a + B_1 Centrality_{t-1} + B_2 TQ_{t-1} + B_3 Size_{t-1} + B_4 Profitability_{t-1} + B_5 Leverage_{t-1} + B_6 Capital\ Investment_{t-1} + B_7 Investment\ in\ Innovation_{t-1} + B_8 R\&D\ Missing + e_t \quad (1)$$

The dependent variable TQ_t is the industry adjusted Tobin's Q, calculated by subtracting the industry median Tobin's Q based on four digits SIC industry code for all Compustat firms. Tobin's Q is the market to book ratio of the firm ,where the market value is measured by multiplying the stock price at the end of the fiscal year by the number of shares outstanding, plus the book value of total asset, less the book value of equity, and less the amount of deferred taxes , $Centrality_{t-1}$ is the CEO network centrality expressed in percentiles and as defined in section 2.1, $Profitability_{t-1}$ is the operating income divided by total assets, $Size_{t-1}$ is the log of total assets, $Leverage_{t-1}$ is the ratio of total debt to total equity, Capital $Investment_{t-1}$ is the ratio of capital expenditures to total assets, and Investment in $Innovation_{t-1}$ is the ratio of research and development expenses to total assets. When the R&D expense is missing, the Investment in Innovation is set to zero, and a dummy R&D Missing is set to equal 1. This panel only includes CEOs who remain to be the same in the following year due to using time lags; all independent variables are lagged one year.

The results of this model are included in Table 5. CEO network centrality is measured using Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. Columns 1, 3, 5, and 7 display the results of running model (1). Columns 2, 4, 6, and 8 display the results of model (1) but after controlling for Centrality^ which is the predicted value of centrality as determined in the model of CEO determinants (computed using models presented in Table 4 section 4.1.3). The reason why I include Centrality^ is because I want to control for the CEO network centrality that is determined one year before starting the CEO job and hence is not directly related to the company related factors effecting CEO network centrality, and then studying the impact of current CEO network centrality on firm's valuation. However, due to data limitations and inability to predict the CEO network

centrality for the CEOs who were CEOs in their companies before 1997, I predict the CEO network centrality for them based on one year before the sample starts.

In all models 1-8, CEO network centrality is significant and positive indicating that increases in CEO network centrality, increases the firm's market to book ratio. This evidence supports alternative hypothesis H3a. The CEO can leverage on the information advantages gained through her central position in the network, and this is reflected through positive market valuation.[13] [14]

Next, I repeat the analysis of Table 5 but after controlling for governance factors that are known in the literature to impact the firm's valuation. Faleye et al. (2011) show that intensive monitoring boards (when the majority of the board is represented by independent members that serve on at least two of the three principal monitoring committees) could adversely impair corporate innovation and hence adversely impact the firm's success and value. Yermack (1996) documents that smaller boards are generally associated with higher market valuation. Bebchuk et al. (2009) show that firms with higher entrenchment index (constructed by adding 1 for the following six provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments) are value destructive , higher ownership concentration in the form of block holdings (above 5%)

[13] Another possible reason could be due to the increased in riskiness of CEO investment strategies which results in higher Tobin's Q that proxies for investment and growth opportunities. Currently I do not specifically test for this assumption.

[14] El-Khatib, Fogel, and Jandik (2012) show that CEO network centrality in bidders lead to value-destroying acquisitions, hence supporting the managerial entrenchment hypothesis. However, it is important to note that the authors first show how those bidders are extremely highly central, so they do not represent the average normal CEO network centrality. Moreover, in M&A context, the general outcome for bidders is negative, and hence the CEOs who are conducting those acquisitions are self selecting themselves to being bidders knowing the ultimate negative outcome of bidders. Thus this evidence relates to excessive centralities that are particularly related to M&A bidders rather than all average S&P 1500 firms.

or greater share of CEO ownership is generally associated with improved monitoring and hence improved market valuation (Shleifer and Vishny, 1997), though high CEO ownership can also facilitate entrenchment thus reducing market valuation (Morck et al., 1988). On the other hand, CEO-Chairman duality leads to greater extraction of rents from shareholders (Bebchuk and Cohen, 2005) thus reducing market valuation. CEO age can have both positive (Milbourn, 2003) or detrimental (Hermalin and Weisbach, 1998) effect on the quality of managerial decisions and market values.

The results are reported in Table 6. In those models where I control for governance, the sample drops to 2780 different CEOs, in 1913 different firms, and 10951 firm year observations due to some missing data items.[15] *Intense_Monitoring* is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise. An intensive monitor is an independent director who serves on both the audit and compensation committee (Faleye et al., 2011). *Small_Board* is a dummy variable that equals 1 if the board size is less than 8 and zero otherwise. *CEO_not_Chairman* is a dummy variable that equals one if the CEO is not the chairman of the board and zero otherwise. *Low_Eindex* is a dummy variable that equals 1 if Bebchuk, Cohen and Ferrell's entrenchment index (2009) is less than 3 and zero otherwise. *Older_CEO* is a dummy variable that equals 1 if the CEO's age is above the sample median and zero otherwise. *Block_Ownership* is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero

[15] I use a name matching algorithm to match the CEOs as reported in BoardEx to names of executives and directors in Risk Metrics and obtain the governance data. Furthermore, I manually search for any unmatched CEOs to ensure the accuracy of the matching program. I finally fill in any missing values if available in Execucomp (for example title of CEO to determine whether the CEO holds also the Chairman position).

otherwise. *High_CEO_Ownership* is a dummy variable that equals 1 if the percentage of shares owned by the CEO is higher than the sample median.

The results of Table 6 confirm the positive effect of CEO network centrality on Industry adjusted Tobin's Q after controlling for governance, although when using Eigenvector as a measure of centrality in columns 7 and 8, the CEO network centrality loses its statistical significance.

4.2.2 The Effect on Accounting Performance

To study the effect of CEO network centrality on the firm's accounting performance, I use return on assets as a measure of the accounting performance and I run the following panel of OLS regressions using robust standard errors that are clustered at the firm level, and including year fixed effects:

$$ROA_t = a + B_1 Centrality_{t-1} + B_2 Size_{t-1} + B_3 Leverage_{t-1} + B_4 Capital\ Investment_{t-1} + B_5 Investment\ in\ Innovation_{t-1} + B_6 R\&D\ Missing + e_t \quad (2)$$

ROA_t is the industry adjusted ROA that is formed by subtracting the industry median based on the four digits SIC code for all Compustat firms. Return on assets is the operating income divided by total assets. All other variables are as previously defined and are lagged one period.

The results of this model are presented in Table 7. CEO network centrality is measured by Closeness in columns 1 and 2, Degree in columns 3 and 4, Betweenness in columns 5 and 6, and Eigenvector in columns 7 and 8. Columns 2, 4, 6, and 8 display the results of model (2) but after controlling for Centrality^ which is as previously explained in section 4.1.2. In models 1, 3, 5, and 7, CEO network centrality is positive and statistically significant confirming hypothesis H3a.

However, the coefficient on CEO network centrality loses significance when controlling for Centrality^ in models 2, 4 , 6, and 8. Centrality^ on the other hand is positive and significant in all those models. This evidence can be explained by the fact that the accounting data, compared to market stock prices, does not timely reflect the values of current information possessed by the central CEOs, and it just picks up the initial values of CEO network centrality.[16] Hence after controlling for those initial values, the CEO network centrality loses its statistical significance.

Table 8 repeats the analysis presented in Table 7 but with additional controls for governance. The results are very similar to the ones in Table 7. The Coefficient on CEO Network Centrality remains positive and statistically significant in models 1, 3, 5, and 7, and loses statistical significance after controlling for Centrality^ except when using Degree in column 4, the Centrality variable remains to be significant at the 10% level. The coefficient on *Intense_Monitoring* is positive and significant while it was negative and significant in Table 6 when studying the impact on Tobin's Q. This suggests that intensive monitors improve the accounting performance of the firms due to their effective monitoring but this also reduces the firm's innovation and growth opportunities, thus reducing Tobin's Q. Moreover, other effective controls like separating the CEO from the Chairman position and having block ownership improves the accounting performance as well. While higher CEO ownership decreases accounting performance indicating that high CEO ownership could result in sub-optimal decisions due to managerial entrenchment.

4.3 The Effect of CEO Network Centrality on CEO Compensation

[16] Another possible reason that could mitigate the positive impact of CEO network centrality on ROA is that the CEOs could be busy in trying to maintain their social networks and fulfilling their social obligations, hence this might be an opportunity cost that impairs their corporate decision making and profitability of their business operations.

4.3.1 Total Compensation

To explore the effect of CEO network centrality on CEO total compensation, I use the log of the sum of salary, bonus, and restricted stock grants (data item tdc1as reported in Execucomp) and I run the following panel of OLS regressions using robust standard errors that are clustered at the firm level, and including year and industry dummies:

$$\text{Total Compensation}_t = a + B_1\text{Centrality}_{t-1} + B_2\text{Size}_{t-1} + B_3\text{Profitability}_{t-1} + B_4\text{Leverage}_{t-1} + B_5\text{Capital Investment}_{t-1} + B_6\text{Investment in Innovation}_{t-1} + B_7\text{R\&D Missing} + e_t \quad (3)$$

The results of this estimation are reported in Table 9. CEO network centrality is measured using Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. Columns 1, 3, 5, and 7 display the results of testing the model (3) above. Columns 2, 4, 6, and 8 display the results of model (3) but after controlling for Centrality^ which is the predicted value of centrality as estimated in the model of CEO determinants (Table 4 section 4.1.3) but without using *Salary* as one of the determinants of CEO network centrality. The coefficient on CEO network centrality is highly significant (at the 1% level) and positive in all models. This evidence supports hypothesis H4. An increase in CEO network centrality is associated with increases in CEO total compensation. All other control variables that impact CEO total compensation have the expected sign and are statistically significant. CEOs who run larger, more profitable, capital intensive and innovated firms command statistically higher CEO total compensation. While CEO's total compensation is insignificantly related to the degree of firm's leverage. The results of CEO centrality and controls hold after controlling for governance in Table 10. Furthermore, more effective governance indicated by separate CEO - Chairman positions (*CEO_not_Chairman),* lower

entrenchment as measured by the entrenchment index (Low_*Entrenchment*), presence of ownership of more than 5% of the firm's outstanding shares (*Block_Ownership*) significantly decrease the CEO total compensation.

4.3.2 Incentive Compensation

To present more evidence related to the effect of CEO network centrality on CEO compensation, I repeat the analysis done in (4) using equity compensation as the dependent variable. If the CEO command higher compensation due to the information advantages that she possesses from being central in the social network, then this positive relationship between CEO compensation and CEO network centrality should be significant also when using only the equity component of the CEO compensation as a measure of incentive compensation. To study such relationship, I use the ratio of the sum of the value of restricted shares granted (rstkgrnt in Execucomp) and the Black-Scholes value of options granted (option_award_blk in Execucomp) to the total compensation as a measure of equity compensation. The results are presented in Table 11. Using Closeness in columns 1 and 2, Degree in columns 3 and 4, Betweenness in columns 5 and 6, and Eigenvector in columns 7 and 8, increases in CEO network centrality, significantly increases the CEO's equity compensation. The difference in the results between using CEO total compensation and CEO incentive compensation lies in Centrality^. Centrality^ is positive and statistically significant in 2 out of the 4 models when using equity compensation compared to being statistically insignificant in models of total compensation (Tables 9 and 10). This is an indication of how the centrality that comes from determinants that are not related to the CEO's current job (prior education ties, career paths, and personal traits) command high equity compensation due to the CEO's ability to utilize such social connections in getting general

information that is not company specific. However, increases in CEO network centrality after becoming a CEO is related to both performance and social factors that commands an increase not only in equity compensation, but also in total compensation. The results reported in Table 11 are robust and very similar to the results in Table 12 after including controls for measures of effective governance. The measures of effective governance also have similar impact on incentive compensation as on total compensation.

4.3.3 CEO Pay Slice

Bebchuck et al. (2011) compute how much of the total compensation that is paid to the top five executives in the firm is awarded to the CEO and refer to it as the CEO pay slice. They argue that the higher CEO pay slice is not only a consequence of the higher importance of the CEO, but also the higher entrenchment of that CEO and thus indicates presence of agency problems in the firm. To investigate whether the CEO network centrality is related to such measure of CEO pay slice, I utilize a model similar to model (3) and use the CEO pay slice as the dependent variable. The results of this estimation are presented in Table 13. CEO network centrality is computed using Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. The coefficient on CEO network centrality is positive and significant in all 8 models. Hence, higher CEO network centrality commands higher CEO pay slice.[17] Results of Table 13 are robust and similar after controlling for measures of effective governance in Table 14. Moreover, *Intense_Monitoring, CEO_not_Chairman, Low_Entrenchment,* and *Block_Ownership* have the expected significant

[17] This could be due to the importance of the CEO due to her social status and information advantages, or due to the entrenchment of the CEO, but I currently do not disentangle those two reasons.

negative sign. Hence, effective governance mechanisms decrease the share of the total compensation that goes to the CEO, and distributes it more evenly across the top 5 executives.

4.3.4 Pay-Performance Sensitivity

As a final investigation of the impact of CEO network centrality on compensation, I model the impact of CEO network centrality on the CEO's pay sensitivity to performance. I employ Edman's et al. (2009) scaled measure of pay-performance sensitivity which measures the dollar change in wealth for a percentage change in firm value scaled by total compensation.[18] A positive coefficient on CEO network centrality will suggest that higher CEO network centrality is associated with CEO's pay that is more sensitive to performance.

The results are presented in Table 15. This panel of OLS regressions include 12272 firm year observations representing 3041 different CEOs in 2050 different firms due to the matching of the data with Edman's et al. (2009) scaled measure of pay-performance sensitivity.[19] I use the log of the scaled measure of pay for performance sensitivity as the dependent variable. CEO network centrality is measured using Closeness in columns 1 and 2, Degree in columns 3 and 4, Betweenness in columns 5 and 6, and Eigenvector in columns 7 and 8. In all models, the impact of CEO network centrality on the scaled measure of pay-performance sensitivity is negative and statistically significant. This effect also applies to the Centrality^ which is measured before the CEO starts her job as CEO. This could refer to the power that the CEO in fact gains from being central in the social network and hence makes her wealth insensitive to performance. When

[18] There are other ways of computing pay for performance sensitivity, see for example Jensen and Murphy (1990), Hall and Liebman (1998). I use this measure because it is independent of firm size.

[19] I download the measures of scaled pay-performance sensitivity from Edman's website http://finance.wharton.upenn.edu/~aedmans/scaledwps.csv

controlling for effective governance measure in Table 16, the results are very similar. The governance mechanisms that seem to be effective in making the CEO more sensitive to performance are small board size and block ownership. Ultimately, the pay of a CEO who has lower entrenchment index will be more sensitive to performance, as well as the CEO that has high common stock ownership.

5. Conclusion

Using data provided in BoardEx on the common prior and current employment connections of executives and directors of US public companies, I first compute four measures of CEO network centrality: Closeness, Degree, Betweenness, and Eigenvector, and then utilize the other data provided by BoardEx on education; experience in listed, unlisted, and S&P 1500 firms; board memberships in public, private, and non-profit boards; and CEO age, as well as data in Risk Metrics on memberships in boards of S&P 1500 firms, data in Execucomp related to the first full salary of the CEO on the job, and common measures of CEO overconfidence and CEO optimism to identify the determinants of CEO network centrality.

I find that attending one of the "elite" universities, having prior experience in publicly listed firms, serving on the boards of publicly listed firms, serving on the boards of S&P 1500 firms, as well as being more successful in the past career path, measured by the first salary received by the CEO on the job, increases CEO network centrality. Conversely, spending longer period in the career path before being appointed as CEO, being overconfident or optimistic, reduces the CEO network centrality.

After understanding the main determinants of CEO network centrality before the CEO starts the job, I examine the effect of CEO network centrality on the firm's valuation measured by

market to book ratio, the accounting performance measured by ROA, and the CEO compensation measured by total compensation, equity based compensation, the CEO pay slice, and the scaled measured of pay-performance sensitivity. I find that higher CEO centrality is associated with significantly higher firm market values, insignificantly higher ROA, and significantly higher CEO compensation. Furthermore, higher CEO network centrality reduces the sensitivity of the CEO's pay to performance.

Overall this paper is considered one of the few studies that focus on computing CEO network centrality rather than simply focusing on bilateral social connections within or across executives and directors of US firms. Those measures of CEO network centrality provide an indication of the CEO's overall connectedness to the entire social network of executives and directors. Moreover, this research is considered one of the first studies that analyze the determinants of CEO network centrality and then explores the impact of such CEO network centrality on firm's valuation and performance. Areas for future research include investigation of the possible costs arising from CEO network centrality when the CEO rise in network power; such as exploring changes in operating performance, spending on innovation, and different investment patterns. Finally, another area for future research includes studying the effect of board constraints and corporate governance such as board size, block ownership, intensive board monitoring, and shareholder activism on the CEO network centrality.

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Table 1 : Summary Statistics

Table 1 presents summary statistics for key variables used in the panel regressions. Those panel regressions represent 3230 different S&P 1500 CEOs, in 2130 firms, and 13082 firm year obs. The statistics are presented for the centrality variables in panel A, and centrality percentiles in panel B (as defined in section 2.1). Panel C includes statistics on key financial variables. *TQ industry adjusted* is the four digit SIC industry adjusted Tobin's Q formed by subtracting the industry median for all Compustat firms. Tobin's Q is the market to book ratio of the firm, where the market value is measured by multiplying the stock price at the end of the fiscal year by the number of shares outstanding, plus the book value of total assets, less the book value of equity, and less the amount of deferred taxes . *ROA industry adjusted* is the four digit SIC industry adjusted ROA formed by subtracting the industry median for all Compustat firms. ROA is the ratio of operating income to average total assets. *Size* is the log of total assets. *Leverage* is the ratio of total debt to total equity. *Capital Investment* is the ratio of capital expenditures to total assets. *Investment in Innovation* is the ratio of research and development expenses to total assets. Panel D includes statistics on compensation variables*; Log Total Compensation* is the log of total compensation (tdc1 in Execucomp) which includes salary, bonus, and value of restricted stock grants. *Equity Based Compensation* is the ratio of total equity compensation to total compensation. Total equity compensation is the sum of the value of the restricted shares granted (rstkgrnt in Execucomp) and the Black-Scholes value of options granted (option_awards_blk in Execucomp). *CEO Pay Slice* is Bebchuk, Cremers, and Peyer's (2011) ratio of CEO total compensation to the sum of 5 top executives' total compensation, where total compensation is TDC1 as reported in Execucomp.

	Mean	Median	Std.Dev.	25th percentile	75th percentile
Panel A : Centrality Variables					
Closeness	0.2901	0.2884	0.0379	0.2685	0.3098
Degree	0.0006	0.0003	8.32E-04	0.0001	0.0007
Betweenness	0.0001	1.56E-05	1.99E-04	7.71E-07	0.0001
Eigenvector	5.73E-04	7.99E-06	0.0038	9.50E-07	0.0001
Panel B: Centrality Percentiles					
Closeness	68	73	21.7995	54	86
Degree	72	79	24.0320	55	93
Betweenness	76	84	24.6391	66	94
Eigenvector	74	78	21.3088	60	92
Panel C: Financial Variables					
TQ industry adjusted	1.3851	1.2567	0.4610	1.0603	1.5911
ROA industry adjusted	0.0303	0.0445	0.0790	0.0180	0.0723
Size	7.6317	7.5006	1.6912	6.4093	8.7634
Leverage	0.7915	0.4842	0.9310	0.1008	1.0630
Capital Investment	0.2258	0.1867	0.1683	0.1107	0.3036
Investment in Innovation	0.0257	0.0000	0.0481	0.0000	0.0297
Panel D : Compensation Variables					
Log Total Compensation	7.986238	8.008774	1.210514	7.259635	8.739785
Equity Based Compensation	.2594974	0	.460023	0	.5233691
CEO Pay Slice	0.3844127	0.387034	0.1234897	0.3154573	0.453705

Table 2 : Determinants of CEO Network Centrality – CEO Career

Table 2 reports results of cross sectional regressions of CEO centrality on variables capturing CEO career paths, past success, and other work related determinants. This sample includes S&P 1500 CEOs who started their job as a CEO during or after 1997. CEO centrality is measured using Closeness, Degree, Betweenness, and Eigenvector centrality in panels A, B, C, and D, respectively. Independent variables include *Elite*, a dummy equal to 1 if a CEO attended Ivy League universities and 0 otherwise ; *Listed Work Experience*, a dummy equal to1 if the CEO had experience in a publicly listed firm and 0 otherwise; *Yrs Listed Work Experience,* the total number of years a CEO had worked in listed firms; *S&P Work Experience*, a dummy equal to 1 if a CEO had work experience in an S&P 1500 firm and 0 otherwise; *Yrs S&P Work Experience*, the total number of years a CEO had worked in any S&P 1500 firms; *Public Board Seats,* the total number of directorship in listed companies; *Private Board Seats,* the total number of directorship in unlisted companies; *Non-Profit Board Seats,* the total number of directorship in non-profit organizations; S&P Board Seat, a dummy equal to 1 if the CEO sat on an S&P 1500 board and 0 otherwise; *Total S&P Board Seats*, the total number of directorships in S&P 1500 companies. All work experience measures are taken one year before the CEO receives her first CEO appointment. Lastly, as an overall measure of CEO's prior career success, *Salary* is the log of the cash salary for her first full year on the CEO job. P-values are in parentheses.

Panel A – Closeness	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Elite	0.0591***								0.0372***
	(0.000)								(0.005)
Listed Work Experience		0.0881***							0.0229*
		(0.000)							(0.089)
Yrs Listed Work Experience		-0.0061***							-0.0029
		(0.000)							(0.288)
S&P Work Experience			0.0295						-0.0126
			(0.551)						(0.783)
Yrs S&P Work Experience			-0.0028**						-0.0037
			(0.027)						(0.174)
Public Board Seats				0.0440***					0.0309***
				(0.000)					(0.000)
Private Board Seats					0.0131***				-0.0009
					(0.000)				(0.591)
Non-Profit Board Seats						0.0756***			0.0245
						(0.000)			(0.161)
S&P Board Seat							0.1198***		0.1013***
							(0.000)		(0.000)
Total S&P Board Seats							0.0298***		0.0065

							(0.000)		(0.269)
Salary								0.0319***	0.0248***
								(0.000)	(0.000)
Constant	0.6508***	0.6822***	0.6295***	0.5723***	0.5723***	0.5723***	0.6433***	0.5195***	0.4777***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033
Adjusted R^2	0.008	0.017	0.008	0.090	0.026	0.007	0.089	0.040	0.166
Panel B- Degree	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Elite	0.0770***								0.0494***
	(0.000)								(0.000)
Listed Work Experience		0.1089***							0.0302**
		(0.000)							(0.028)
Yrs Listed Work Experience		-0.0058***							-0.0005
		(0.000)							(0.853)
S&P Work Experience			0.0883						0.0300
			(0.170)						(0.616)
Yrs S&P Work Experience			-0.0018						-0.0062**
			(0.159)						(0.017)
Public Board Seats				0.0504***					0.0274***
				(0.000)					(0.000)
Private Board Seats					0.0159***				0.0007
					(0.000)				(0.617)
Non-Profit Board Seats						0.0727***			0.0106
						(0.001)			(0.584)
S&P Board Seat							0.1645***		0.1424***
							(0.000)		(0.000)
Total S&P Board Seats							0.0363***		0.0147***
							(0.000)		(0.009)
Salary								0.0382***	0.0298***
								(0.000)	(0.000)

Constant	0.6904***	0.7194***	0.6105***	0.5889***	0.5889***	0.5889***	0.6520***	0.4913***	0.3751***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033
Adjusted R^2	0.008	0.019	0.006	0.099	0.032	0.008	0.133	0.057	0.214

Panel C - Betweenness	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Elite	0.0822***								0.0544***
	(0.000)								(0.001)
Listed Work Experience		0.1455***							0.0618***
		(0.000)							(0.000)
Yrs Listed Work Experience		-0.0047***							0.0012
		(0.009)							(0.567)
S&P Work Experience			0.1722**						0.1143*
			(0.017)						(0.091)
Yrs S&P Work Experience			0.0007						-0.0070***
			(0.713)						(0.004)
Public Board Seats				0.0553***					0.0321***
				(0.000)					(0.000)
Private Board Seats					0.0170***				0.0003
					(0.000)				(0.835)
Non-Profit Board Seats						0.0666***			0.0026
						(0.004)			(0.887)
S&P Board Seat							0.1795***		0.1581***
							(0.000)		(0.000)
Total S&P Board Seats							0.0282***		-0.0000
							(0.000)		(0.998)
Salary								0.0224***	0.0146***
								(0.001)	(0.005)
Constant	0.7039***	0.7264***	0.5338***	0.6221***	0.6221***	0.6221***	0.6654***	0.5358***	0.3457***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

N	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033
Adjusted R^2	0.006	0.027	0.006	0.089	0.026	0.004	0.104	0.024	0.163

Panel D - Eigenvector	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
Elite	0.0565***								0.0400***
	(0.000)								(0.002)
Listed Work Experience		0.0735***							0.0185
		(0.000)							(0.147)
Yrs Listed Work Experience		-0.0054***							-0.0015
		(0.000)							(0.494)
S&P Work Experience			0.0018						-0.0380
			(0.971)						(0.432)
Yrs S&P Work Experience			-0.0027**						-0.0046**
			(0.024)						(0.047)
Public Board Seats				0.0324***					0.0178***
				(0.000)					(0.000)
Private Board Seats					0.0086***				-0.0017
					(0.000)				(0.275)
Non-Profit Board Seats						0.0570***			0.0182
						(0.002)			(0.295)
S&P Board Seat							0.1178***		0.1041***
							(0.000)		(0.000)
Total S&P Board Seats							0.0263***		0.0146***
							(0.000)		(0.005)
Salary								0.0214***	0.0152***
								(0.000)	(0.001)
Constant	0.7289***	0.7510***	0.7352***	0.6863***	0.6863***	0.6863***	0.7150***	0.5920***	0.5870***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033	3,033
Adjusted R^2	0.006	0.012	0.005	0.052	0.012	0.003	0.087	0.030	0.131

Table 3 : Determinants of CEO Network Centrality - Personal Characteristics

Table 3 reports cross sectional regressions of CEO centrality on variables capturing the personal characteristics of CEOs. CEO centrality is measured using Closeness, Degree, Betweenness, and Eigenvector centrality in Panels A, B, C, and D, respectively. Independent variables include *Age*, CEO's age one year before her first CEO appointment; *M&T Overconfidence*, the Malmendier and Tate (2005) measure, *Otto Optimism*, the Otto (2012) measure. Both *M&T Overconfidence* and *Otto Optimism* measures are explained in section 4.1.2. P-values are in parentheses.

Panel A - Closeness	**(1)**	**(2)**	**(3)**	**(4)**
Age	0.002***			0.001**
	(0.001)			(0.012)
M&T Overconfidence		-0.051***		-0.050***
		(0.000)		(0.000)
Otto Optimism			-0.048***	-0.047***
			(0.000)	(0.000)
Constant	0.572***	0.620***	0.638***	0.538***
	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033
Adjusted R^2	0.004	0.023	0.033	0.047
Panel B : Degree	**(1)**	**(2)**	**(3)**	**(4)**
Age	0.003***			0.002***
	(0.000)			(0.001)
M&T Overconfidence		-0.034***		-0.034***
		(0.005)		(0.005)
Otto Optimism			-0.032**	-0.033**
			(0.022)	(0.022)
Constant	0.568***	0.652***	0.678***	0.533***
	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033
Adjusted R^2	0.007	0.020	0.024	0.039
Panel C - Betweenness	**(1)**	**(2)**	**(3)**	**(4)**
Age	0.004***			0.003***
	(0.000)			(0.000)
M&T Overconfidence		-0.034**		-0.036**
		(0.023)		(0.016)
Otto Optimism			-0.015	-0.015
			(0.367)	(0.365)
Constant	0.524***	0.672***	0.698***	0.496***
	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033
Adjusted R^2	0.010	0.011	0.009	0.024

Panel D - Eigenvector	**(1)**	**(2)**	**(3)**	**(4)**
Age	0.001			0.000
	(0.162)			(0.563)
M&T Overconfidence		-0.040***		-0.038***
		(0.000)		(0.000)
Otto Optimism			-0.048***	-0.048***
			(0.000)	(0.000)
Constant	0.703***	0.696***	0.713***	0.670***
	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033
Adjusted R^2	0.001	0.021	0.031	0.042

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 4 : Determinants of CEO Network Centrality – CEO Career and Personal Characteristics

Table 4 reports cross sectional regressions of CEO centrality on variables capturing both the CEO career and personal characteristics. CEO centrality is measured using Closeness, Degree, Betweenness, and Eigenvector centrality in models 1, 2, 3, and 4, respectively. All independent variables are as previously defined. P-values are in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**
	Closeness	**Degree**	**Betweenness**	**Eigenvector**
Elite	0.039***	0.050***	0.055***	0.041***
	(0.003)	(0.000)	(0.001)	(0.001)
Listed Work Experience	0.022*	0.029**	0.061***	0.018
	(0.093)	(0.031)	(0.000)	(0.149)
Yrs Listed Work Experience	-0.001	0.001	0.002	-0.000
	(0.570)	(0.808)	(0.368)	(0.994)
S&P Work Experience	-0.037	0.006	0.099	-0.066
	(0.426)	(0.919)	(0.143)	(0.173)
Yrs S&P Work Experience	-0.005*	-0.007***	-0.007***	-0.005**
	(0.082)	(0.006)	(0.003)	(0.014)
Public Board Seats	0.029***	0.026***	0.031***	0.016***
	(0.000)	(0.000)	(0.000)	(0.000)
Private Board Seats	-0.001	0.001	0.000	-0.001
	(0.712)	(0.495)	(0.828)	(0.440)
Non-Profit Board Seats	0.021	0.008	-0.001	0.016
	(0.236)	(0.678)	(0.976)	(0.383)
S&P Board Seat	0.099***	0.141***	0.157***	0.103***
	(0.000)	(0.000)	(0.000)	(0.000)
Total S&P Board Seats	0.010	0.018***	0.002	0.019***
	(0.106)	(0.002)	(0.791)	(0.001)
Salary	0.021***	0.027***	0.012**	0.012***
	(0.000)	(0.000)	(0.017)	(0.004)
Age	-0.001	-0.001	0.000	-0.001**
	(0.295)	(0.300)	(0.900)	(0.017)
M&T Overconfidence	-0.039***	-0.023**	-0.034**	-0.031***
	(0.000)	(0.034)	(0.013)	(0.003)
Otto Optimism	-0.041***	-0.025**	-0.006	-0.043***
	(0.001)	(0.049)	(0.696)	(0.000)
Constant	0.533***	0.429***	0.354***	0.681***
	(0.000)	(0.000)	(0.000)	(0.000)
N	3,033	3,033	3,033	3,033
Adjusted R^2	0.188	0.225	0.167	0.157

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively*

Table 5: Effect of CEO Network Centrality on Firm Valuation

Panel regressions of industry adjusted Tobin's Q on CEO centrality levels are presented in Table 5. Industry adjusted Tobin's Q is the four digit SIC industry adjusted Tobin's Q formed by subtracting the industry median for all Compustat firms. Centrality is measured by Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. Models 2, 4, 6 and 8 include Centrality$^{\wedge}$ which is the predicted value of centrality as a result of running the cross regression of all CEO determinants (models 1-4 in Table 4) on CEO centrality one year before her first appointment as CEO. If the CEO was appointed before 1997, then her centrality and all independent variables are measured one year before the sample starts. All other variables are as previously defined and are lagged one period. All models include year dummies. P-values are in parentheses. Robust standard errors are clustered at firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.060***	0.063***	0.053***	0.055***	0.044***	0.046***	0.032**	0.031*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.034)	(0.051)
Centrality$^{\wedge}$		-0.014		-0.010		-0.010		0.007
		(0.655)		(0.710)		(0.735)		(0.852)
TQ Industry Adjusted $_{t-1}$	0.653***	0.653***	0.654***	0.654***	0.654***	0.654***	0.654***	0.654***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.015***	-0.015***	-0.016***	-0.016***	-0.014***	-0.014***	-0.013***	-0.014***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	0.072	0.072	0.070	0.070	0.068	0.068	0.068	0.067
	(0.100)	(0.100)	(0.108)	(0.108)	(0.114)	(0.114)	(0.121)	(0.121)
Leverage	-0.007**	-0.007**	-0.007**	-0.007**	-0.007**	-0.007**	-0.007**	-0.007**
	(0.031)	(0.032)	(0.026)	(0.025)	(0.021)	(0.020)	(0.023)	(0.023)
Capital Investment	-0.014	-0.014	-0.012	-0.013	-0.011	-0.011	-0.012	-0.012
	(0.377)	(0.352)	(0.442)	(0.421)	(0.495)	(0.480)	(0.427)	(0.424)
Investment in Innovation	0.625***	0.624***	0.623***	0.622***	0.643***	0.643***	0.631***	0.632***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	-0.036***	-0.036***	-0.036***	-0.037***	-0.038***	-0.038***	-0.038***	-0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.577***	0.583***	0.585***	0.590***	0.576***	0.581***	0.581***	0.577***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	13,082	13,082	13,082	13,082	13,082	13,082	13,082	13,082
Adjusted R^2	0.621	0.621	0.621	0.621	0.620	0.620	0.620	0.620

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 6: Effect of CEO Network Centrality on Firm Valuation after Controlling for Governance

This table includes the same panel regressions of industry adjusted Tobin's Q on CEO centrality level as presented in Table 5 but after controlling for firm governance. *Intense_Monitoring* is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise, *Small_Board* is a dummy variable that equals 1 if the board size is less than 8 and zero otherwise, *CEO_not_Chair* is a dummy variable that equals 1 if the CEO does not hold the Chairman position and zero otherwise, *Low_Eindex* is a dummy variable that equals 1 if Bebchuk, Cohen and Ferrell's (2009) entrenchment index is lower than 3 and zero otherwise, *Older_CEO* is a dummy variable that equals 1 if the CEO is older than the sample median and zero otherwise, *Block_Ownerhsip* is a dummy variable that equals 1 if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise, *High_CEO_Ownership* is a dummy variable that equals 1 if the CEO's percentage ownership of firm's common stock is higher than the sample median and zero otherwise, and all other variables are as previously defined. All independent variables are lagged one year. All models include year dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Models	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.049***	0.052***	0.050***	0.051***	0.048***	0.050***	0.025	0.024
	(0.002)	(0.002)	(0.001)	(0.001)	(0.000)	(0.000)	(0.132)	(0.157)
Centrality^		-0.013		-0.007		-0.013		0.009
		(0.657)		(0.780)		(0.665)		(0.785)
TQ Industry Adjusted $_{t-1}$	0.674***	0.674***	0.675***	0.674***	0.674***	0.674***	0.675***	0.676***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.015***	-0.015***	-0.016***	-0.016***	-0.015***	-0.015***	-0.014***	-0.014***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	0.066	0.066	0.064	0.065	0.065	0.065	0.063	0.063
	(0.112)	(0.112)	(0.121)	(0.121)	(0.118)	(0.118)	(0.125)	(0.127)
Leverage	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004	-0.004
	(0.287)	(0.296)	(0.270)	(0.271)	(0.250)	(0.250)	(0.244)	(0.244)
Capital Investment	-0.019	-0.020	-0.019	-0.019	-0.018	-0.018	-0.018	-0.018
	(0.212)	(0.202)	(0.226)	(0.220)	(0.254)	(0.249)	(0.252)	(0.255)
Investment in Innovation	0.567***	0.566***	0.560***	0.559***	0.576***	0.576***	0.573***	0.574***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	-0.042***	-0.042***	-0.042***	-0.042***	-0.043***	-0.043***	-0.044***	-0.044***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Intense_Monitoring	-0.011**	-0.011**	-0.010**	-0.010**	-0.011**	-0.011**	-0.011**	-0.011**
	(0.033)	(0.033)	(0.037)	(0.037)	(0.026)	(0.026)	(0.027)	(0.027)
Small_Board	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.001
	(0.775)	(0.807)	(0.715)	(0.735)	(0.885)	(0.916)	(0.875)	(0.860)
CEO_not_Chairman	-0.016***	-0.016***	-0.016***	-0.016***	-0.016***	-0.016***	-0.017***	-0.017***
	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)	(0.003)	(0.003)
Low_Entrenchment	-0.003	-0.003	-0.002	-0.002	-0.002	-0.002	-0.003	-0.003
	(0.633)	(0.629)	(0.673)	(0.673)	(0.679)	(0.682)	(0.610)	(0.612)
Older_CEO	-0.007	-0.007	-0.007	-0.007	-0.008	-0.007	-0.006	-0.006
	(0.206)	(0.202)	(0.185)	(0.193)	(0.143)	(0.177)	(0.211)	(0.214)
Block_Ownership	0.009	0.009	0.010	0.010	0.010	0.010	0.008	0.008
	(0.142)	(0.148)	(0.124)	(0.125)	(0.128)	(0.128)	(0.192)	(0.184)
High_CEO_Ownership	-0.007	-0.007	-0.007	-0.007	-0.008	-0.008	-0.008	-0.008
	(0.232)	(0.215)	(0.214)	(0.206)	(0.148)	(0.141)	(0.147)	(0.165)
Constant	0.584***	0.590***	0.588***	0.592***	0.581***	0.588***	0.591***	0.586***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	10,951	10,951	10,951	10,951	10,951	10,951	10,951	10,951
Adjusted R^2	0.662	0.662	0.662	0.662	0.662	0.662	0.662	0.662

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 7 : Effect of CEO Network Centrality on Accounting Performance

Panel regressions of industry adjusted ROA on CEO centrality levels are presented in Table 7. Industry adjusted ROA is the four digit SIC industry adjusted ROA formed by subtracting the industry median for all Compustat firms. Centrality is measured by Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. Models 2, 4, 6 and 8 include Centrality$^{\wedge}$ which is the predicted value of centrality as a result of running the cross regression of all CEO determinants (models 1-4 in Table 4) on CEO centrality one year before her first appointment as CEO. If the CEO was appointed before 1997, then the centrality and all independent variables are measured one year before the sample starts. All other variables are as previously defined and are lagged one period. All models include year dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.010	0.003	0.010	0.003	0.005	0.000	0.009	0.002
	(0.166)	(0.728)	(0.142)	(0.658)	(0.345)	(0.958)	(0.208)	(0.783)
Centrality$^{\wedge}$		0.036***		0.031***		0.029***		0.044***
		(0.009)		(0.004)		(0.007)		(0.003)
Size	-0.002**	-0.003***	-0.003**	-0.003***	-0.002*	-0.003**	-0.002**	-0.003***
	(0.032)	(0.010)	(0.023)	(0.007)	(0.055)	(0.016)	(0.039)	(0.009)
Leverage	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.326)	(0.355)	(0.338)	(0.335)	(0.373)	(0.369)	(0.326)	(0.355)
Capital Investment	-0.017**	-0.015**	-0.017**	-0.015**	-0.016**	-0.015**	-0.017**	-0.016**
	(0.024)	(0.036)	(0.026)	(0.038)	(0.030)	(0.040)	(0.021)	(0.033)
Investment in Innovation	-0.756***	-0.752***	-0.757***	-0.752***	-0.751***	-0.749***	-0.758***	-0.754***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	-0.001	-0.001	-0.001	-0.001	-0.002	-0.001	-0.001	-0.001
	(0.681)	(0.792)	(0.667)	(0.787)	(0.549)	(0.668)	(0.653)	(0.795)
Constant	0.061***	0.047***	0.063***	0.049***	0.062***	0.049***	0.061***	0.038***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)
N	13,082	13,082	13,082	13,082	13,082	13,082	13,082	13,082
Adjusted R^2	0.224	0.226	0.224	0.226	0.224	0.225	0.224	0.226

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 8: Benefits of CEO Network Centrality on Accounting Performance after Controlling for Governance

This table includes the same panel regressions of industry adjusted ROA on CEO centrality level as presented in Table 7 but after controlling for firm governance. All variables are as previously defined. All control variables are lagged one year. All models include year dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.015*	0.006	0.015*	0.007	0.009	0.003	0.015*	0.006
	(0.053)	(0.457)	(0.052)	(0.398)	(0.127)	(0.602)	(0.068)	(0.483)
Centrality^		0.048***		0.039***		0.037***		0.060***
		(0.001)		(0.001)		(0.002)		(0.000)
Size	-0.004***	-0.004***	-0.004***	-0.004***	-0.003***	-0.004***	-0.004***	-0.004***
	(0.002)	(0.000)	(0.001)	(0.000)	(0.004)	(0.001)	(0.003)	(0.000)
Leverage	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.377)	(0.436)	(0.396)	(0.396)	(0.445)	(0.438)	(0.369)	(0.403)
Capital Investment	-0.017**	-0.016**	-0.017**	-0.016**	-0.016**	-0.016*	-0.018**	-0.016**
	(0.031)	(0.045)	(0.034)	(0.046)	(0.042)	(0.050)	(0.027)	(0.041)
Investment in Innovation	-0.775***	-0.769***	-0.776***	-0.771***	-0.769***	-0.767***	-0.779***	-0.773***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	0.000	0.001	-0.000	0.000	-0.001	-0.000	-0.000	0.001
	(0.997)	(0.851)	(0.962)	(0.882)	(0.809)	(0.971)	(0.975)	(0.848)
Intense_Monitoring	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**	0.005**
	(0.029)	(0.035)	(0.026)	(0.033)	(0.036)	(0.037)	(0.027)	(0.031)
Small_Board	-0.004	-0.003	-0.003	-0.003	-0.004	-0.003	-0.004	-0.003
	(0.211)	(0.339)	(0.228)	(0.338)	(0.173)	(0.253)	(0.197)	(0.317)
CEO_not_Chairman	0.003	0.002	0.003	0.002	0.003	0.003	0.003	0.002
	(0.304)	(0.444)	(0.287)	(0.346)	(0.306)	(0.295)	(0.326)	(0.383)
Low_Entrenchment	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.749)	(0.781)	(0.774)	(0.780)	(0.762)	(0.746)	(0.733)	(0.775)

Older_CEO	0.004*	0.005*	0.004*	0.004	0.004*	0.003	0.005*	0.005**
	(0.079)	(0.068)	(0.086)	(0.113)	(0.096)	(0.196)	(0.071)	(0.039)
Block_Ownership	0.003	0.004	0.003	0.003	0.003	0.003	0.003	0.004
	(0.362)	(0.268)	(0.339)	(0.294)	(0.382)	(0.371)	(0.364)	(0.254)
High_CEO_Ownership	-0.003	-0.001	-0.003	-0.002	-0.004	-0.003	-0.003	-0.002
	(0.217)	(0.575)	(0.204)	(0.425)	(0.149)	(0.229)	(0.201)	(0.471)
Constant	0.066***	0.043***	0.067***	0.049***	0.068***	0.050***	0.066***	0.031**
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.038)
N	10,951	10,951	10,951	10,951	10,951	10,951	10,951	10,951
Adjusted R^2	0.233	0.236	0.233	0.236	0.232	0.234	0.233	0.236

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 9 : Effect of CEO Network Centrality on CEO Total Compensation

Panel regressions of CEO total compensation on CEO centrality levels are presented in Table 9. CEO total compensation is measured by log of total compensation as reported by Execucomp (tdc1). This includes salary, bonus and restricted stock grants. Centrality is measured by Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. Models 2, 4, 6, and 8 include Centrality$^{\wedge}$ which is the predicted value of centrality as a result of running the regression of all CEO determinants except for salary (models 1-4 in Table 4) on CEO centrality one year before her first appointment as CEO. If the CEO was appointed before 1997, then the regression is based on the Centrality and all independent variables measured one year before the sample starts. All other variables are as previously defined. All independent and control variable are lagged one period. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level. *, **, *** Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.824***	0.816***	0.693***	0.694***	0.562***	0.562***	0.743***	0.702***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Centrality$^{\wedge}$		0.047		-0.004		0.000		0.294
		(0.831)		(0.982)		(1.000)		(0.200)
Size	0.389***	0.388***	0.388***	0.388***	0.416***	0.416***	0.401***	0.397***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	1.110***	1.111***	1.076***	1.076***	1.058***	1.058***	1.088***	1.091***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.015	-0.015	-0.018	-0.018	-0.021	-0.021	-0.015	-0.016
	(0.403)	(0.398)	(0.306)	(0.306)	(0.245)	(0.245)	(0.400)	(0.377)
Capital Investment	0.608***	0.609***	0.631***	0.631***	0.645***	0.645***	0.599***	0.603***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	1.643***	1.645***	1.648***	1.647***	1.929***	1.929***	1.596***	1.604***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	-0.078*	-0.078*	-0.085**	-0.085**	-0.096**	-0.096**	-0.086**	-0.085**
	(0.054)	(0.056)	(0.035)	(0.036)	(0.019)	(0.019)	(0.036)	(0.038)
Constant	4.265***	4.244***	4.368***	4.369***	4.243***	4.243***	4.234***	4.076***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	13,082	13,082	13,082	13,082	13,082	13,082	13,082	13,082
Adjusted R^2	0.341	0.341	0.339	0.339	0.337	0.337	0.338	0.338

Table 10 : Effect of CEO Network Centrality on CEO Total Compensation after Controlling for Governance

This table includes the same panel regressions of CEO total compensation on CEO centrality level as presented in Table 9 but after controlling for firm governance. All variables are as previously defined. All control variables are lagged one year. All models include year dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.712***	0.690***	0.586***	0.569***	0.484***	0.470***	0.633***	0.587***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Centrality^		0.139		0.099		0.103		0.363
		(0.607)		(0.621)		(0.592)		(0.171)
Size	0.383***	0.382***	0.384***	0.383***	0.403***	0.401***	0.393***	0.389***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	1.082***	1.082***	1.052***	1.051***	1.051***	1.051***	1.070***	1.069***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.025	-0.025	-0.027	-0.027	-0.029	-0.029	-0.024	-0.025
	(0.176)	(0.161)	(0.134)	(0.130)	(0.117)	(0.113)	(0.189)	(0.164)
Capital Investment	0.632***	0.634***	0.652***	0.653***	0.662***	0.663***	0.626***	0.631***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	1.609***	1.617***	1.618***	1.624***	1.822***	1.819***	1.565***	1.574***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.003)	(0.003)
R&D Missing	-0.093**	-0.093**	-0.101**	-0.101**	-0.110***	-0.109***	-0.098**	-0.098**
	(0.022)	(0.023)	(0.013)	(0.014)	(0.008)	(0.009)	(0.016)	(0.017)
Intense_Monitoring	0.019	0.019	0.019	0.018	0.010	0.010	0.019	0.019
	(0.570)	(0.582)	(0.575)	(0.587)	(0.772)	(0.772)	(0.565)	(0.573)
Small_Board	-0.004	-0.003	-0.000	0.001	-0.016	-0.015	-0.009	-0.005
	(0.915)	(0.947)	(0.996)	(0.981)	(0.698)	(0.716)	(0.831)	(0.891)
CEO_not_Chairman	-0.148***	-0.151***	-0.145***	-0.146***	-0.144***	-0.144***	-0.153***	-0.156***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Low_Entrenchment	-0.066**	-0.066**	-0.063**	-0.063**	-0.064**	-0.065**	-0.068**	-0.068**

	(0.032)	(0.032)	(0.041)	(0.042)	(0.039)	(0.039)	(0.029)	(0.029)
Older_CEO	-0.012	-0.012	-0.016	-0.017	-0.022	-0.025	-0.007	-0.004
	(0.706)	(0.706)	(0.601)	(0.562)	(0.464)	(0.387)	(0.815)	(0.887)
Block_Ownership	-0.228***	-0.226***	-0.228***	-0.227***	-0.233***	-0.233***	-0.232***	-0.227***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High_CEO_Ownership	-0.024	-0.020	-0.032	-0.030	-0.046	-0.044	-0.031	-0.024
	(0.614)	(0.691)	(0.498)	(0.537)	(0.329)	(0.347)	(0.514)	(0.621)
Constant	4.647***	4.580***	4.736***	4.687***	4.681***	4.630***	4.639***	4.430***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	10,951	10,951	10,951	10,951	10,951	10,951	10,951	10,951
Adjusted R^2	0.345	0.345	0.343	0.343	0.342	0.342	0.343	0.343

, **, *, Denotes statistically significant at the 10%, 5% and 1% levels, respectively.*

Table 11 : Effect of CEO Network Centrality on CEO Incentive Compensation

Panel regressions of CEO equity based compensation on CEO centrality levels are presented in Table 11. CEO equity based compensation is the ratio of total equity compensation to total compensation. Total equity compensation is the sum of the value of the restricted shares granted (rstkgrnt in Execucomp) and the Black-Scholes value of options granted (option_awards_blk in Execucomp). Centrality is measured by Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. All other variables are as previously defined. All independent and control variable are lagged one period. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.098***	0.086***	0.089***	0.084***	0.073***	0.073***	0.106***	0.089***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Centrality^		0.072**		0.027		0.003		0.119***
		(0.033)		(0.373)		(0.918)		(0.002)
Size	0.023***	0.022***	0.022***	0.022***	0.025***	0.025***	0.023***	0.021***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	0.080***	0.082***	0.077***	0.077***	0.075***	0.075***	0.080***	0.081***
	(0.004)	(0.003)	(0.006)	(0.006)	(0.007)	(0.007)	(0.004)	(0.003)
Leverage	-0.006*	-0.006*	-0.006*	-0.006*	-0.007**	-0.007**	-0.006*	-0.006*
	(0.070)	(0.062)	(0.053)	(0.052)	(0.044)	(0.044)	(0.079)	(0.065)
Capital Investment	0.102***	0.104***	0.104***	0.105***	0.106***	0.106***	0.099***	0.101***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	0.477***	0.481***	0.472***	0.474***	0.508***	0.508***	0.457***	0.460***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	-0.016*	-0.016*	-0.017**	-0.017**	-0.018**	-0.018**	-0.016**	-0.016*
	(0.052)	(0.056)	(0.042)	(0.044)	(0.027)	(0.028)	(0.048)	(0.052)
Constant	-0.279***	-0.311***	-0.267***	-0.280***	-0.284***	-0.285***	-0.287***	-0.351***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	13,082	13,082	13,082	13,082	13,082	13,082	13,082	13,082
Adjusted R^2	0.491	0.492	0.491	0.491	0.491	0.491	0.492	0.492

*, **, *** Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.

Table 12 : Effect of CEO Network Centrality on CEO Incentive Compensation after Controlling for Governance

This table includes the same panel regressions of CEO equity based compensation on CEO centrality level as presented in Table 11 but after controlling for firm governance. All variables are as previously defined. All control variables are lagged one year. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.085***	0.078***	0.082***	0.078***	0.073***	0.069***	0.092***	0.082***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Centrality^		0.046		0.025		0.025		0.080*
		(0.197)		(0.420)		(0.431)		(0.052)
Size	0.023***	0.022***	0.022***	0.022***	0.024***	0.024***	0.023***	0.022***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	0.074**	0.074**	0.071**	0.071**	0.071**	0.071**	0.074**	0.074**
	(0.027)	(0.027)	(0.034)	(0.035)	(0.033)	(0.034)	(0.027)	(0.027)
Leverage	-0.006	-0.006*	-0.006*	-0.006*	-0.007*	-0.007*	-0.006	-0.006
	(0.103)	(0.092)	(0.088)	(0.085)	(0.081)	(0.079)	(0.120)	(0.103)
Capital Investment	0.114***	0.115***	0.116***	0.116***	0.117***	0.117***	0.112***	0.113***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	0.476***	0.478***	0.468***	0.470***	0.494***	0.494***	0.458***	0.460***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D Missing	-0.011	-0.011	-0.012	-0.012	-0.013	-0.013	-0.012	-0.011
	(0.200)	(0.204)	(0.175)	(0.179)	(0.140)	(0.146)	(0.196)	(0.198)
Intense_Monitoring	0.000	0.000	0.001	0.000	-0.001	-0.001	0.001	0.001
	(0.968)	(0.983)	(0.927)	(0.940)	(0.909)	(0.910)	(0.906)	(0.916)
Small_Board	0.015**	0.016**	0.016**	0.016**	0.014**	0.014**	0.015**	0.015**
	(0.031)	(0.025)	(0.022)	(0.020)	(0.047)	(0.043)	(0.034)	(0.026)
CEO_not_Chairman	-0.006	-0.007	-0.006	-0.006	-0.005	-0.006	-0.007	-0.008
	(0.293)	(0.229)	(0.345)	(0.313)	(0.372)	(0.361)	(0.260)	(0.205)

Low_Entrenchment	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.831)	(0.832)	(0.901)	(0.895)	(0.882)	(0.873)	(0.806)	(0.810)
Older_CEO	-0.032***	-0.032***	-0.033***	-0.033***	-0.034***	-0.035***	-0.032***	-0.031***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Block_Ownership	-0.052***	-0.052***	-0.052***	-0.051***	-0.052***	-0.052***	-0.052***	-0.051***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High_CEO_Ownership	-0.011	-0.009	-0.012*	-0.011	-0.013**	-0.013*	-0.011*	-0.010
	(0.105)	(0.165)	(0.086)	(0.108)	(0.047)	(0.052)	(0.093)	(0.154)
Constant	-0.249***	-0.271***	-0.241***	-0.253***	-0.250***	-0.263***	-0.255***	-0.302***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	10,951	10,951	10,951	10,951	10,951	10,951	10,951	10,951
Adjusted R^2	0.505	0.505	0.505	0.505	0.505	0.505	0.505	0.506

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 13 : Effect of CEO Network Centrality on CEO Pay Slice

Panel regressions of CEO Pay Slice on CEO centrality levels are presented in Table 13. CEO Pay Slice as defined by Bebchuk, Cremers and Peyer (2011) is the ratio of CEO total compensation (tdc1 in Execucomp) to the sum of the 5 top executives' total compensation. Centrality is measured by Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. All other variables are as previously defined. All independent and control variable are lagged one period. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.049***	0.043***	0.052***	0.048***	0.049***	0.048***	0.044***	0.035***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Centrality^		0.033		0.018		0.012		0.067***
		(0.127)		(0.333)		(0.529)		(0.008)
Size	0.002	0.001	0.001	0.001	0.002	0.002	0.003	0.002
	(0.265)	(0.386)	(0.610)	(0.718)	(0.101)	(0.144)	(0.107)	(0.283)
Profitability	0.052***	0.053***	0.052***	0.052***	0.051***	0.051***	0.051***	0.052***
	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Leverage	0.002	0.002	0.002	0.002	0.001	0.001	0.002	0.002
	(0.438)	(0.457)	(0.465)	(0.470)	(0.509)	(0.514)	(0.439)	(0.483)
Capital Investment	-0.048***	-0.047***	-0.047***	-0.047***	-0.047***	-0.047***	-0.048***	-0.047***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	-0.061	-0.059	-0.070	-0.069	-0.053	-0.053	-0.064	-0.062
	(0.291)	(0.305)	(0.226)	(0.234)	(0.360)	(0.358)	(0.271)	(0.280)
R&D Missing	-0.002	-0.002	-0.002	-0.002	-0.003	-0.003	-0.003	-0.002
	(0.691)	(0.708)	(0.685)	(0.695)	(0.598)	(0.608)	(0.634)	(0.658)
Constant	0.348***	0.333***	0.353***	0.345***	0.342***	0.336***	0.346***	0.310***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	13,082	13,082	13,082	13,082	13,082	13,082	13,082	13,082
Adjusted R^2	0.039	0.040	0.041	0.041	0.042	0.043	0.038	0.040

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 14 : Effect of CEO Network Centrality on CEO Pays Slice after Controlling for Governance

This table includes the same panel regressions of CEO Pay Slice on CEO centrality level as presented in Table 13 but after controlling for firm governance. All variables are as previously defined. All control variables are lagged one year. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	0.047***	0.041***	0.049***	0.044***	0.045***	0.042***	0.044***	0.035***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.005)
Centrality^		0.042*		0.027		0.025		0.071***
		(0.076)		(0.186)		(0.218)		(0.009)
Size	-0.000	-0.001	-0.001	-0.001	0.000	-0.000	0.000	-0.000
	(0.857)	(0.737)	(0.605)	(0.522)	(0.897)	(0.957)	(0.922)	(0.809)
Profitability	0.054**	0.054**	0.053**	0.052**	0.053**	0.053**	0.053**	0.053**
	(0.017)	(0.016)	(0.020)	(0.020)	(0.018)	(0.018)	(0.018)	(0.018)
Leverage	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
	(0.676)	(0.730)	(0.707)	(0.725)	(0.740)	(0.757)	(0.659)	(0.728)
Capital Investment	-0.051***	-0.050***	-0.050***	-0.050***	-0.050***	-0.050***	-0.051***	-0.050***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	-0.081	-0.079	-0.088	-0.087	-0.073	-0.074	-0.085	-0.084
	(0.226)	(0.237)	(0.186)	(0.191)	(0.269)	(0.263)	(0.205)	(0.209)
R&D Missing	0.000	0.000	0.000	0.000	-0.001	-0.000	-0.000	0.000
	(0.963)	(0.951)	(0.992)	(0.980)	(0.922)	(0.948)	(1.000)	(0.995)
Intense_Monitoring	-0.008**	-0.008**	-0.008**	-0.008**	-0.008**	-0.008**	-0.008**	-0.008**
	(0.023)	(0.021)	(0.027)	(0.025)	(0.015)	(0.015)	(0.024)	(0.023)
Small_Board	0.007	0.007	0.007	0.007*	0.006	0.006	0.006	0.007
	(0.136)	(0.109)	(0.104)	(0.091)	(0.181)	(0.163)	(0.153)	(0.117)

CEO_not_Chairman	-0.020***	-0.021***	-0.020***	-0.020***	-0.020***	-0.020***	-0.021***	-0.021***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Low_Entrenchment	-0.016***	-0.016***	-0.016***	-0.016***	-0.016***	-0.016***	-0.016***	-0.016***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Older_CEO	-0.005	-0.005	-0.005	-0.006	-0.006	-0.007*	-0.005	-0.004
	(0.200)	(0.200)	(0.172)	(0.144)	(0.127)	(0.087)	(0.230)	(0.288)
Block_Ownership	-0.023***	-0.023***	-0.023***	-0.023***	-0.023***	-0.023***	-0.024***	-0.023***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High_CEO_Ownership	-0.006	-0.004	-0.006	-0.005	-0.007*	-0.007	-0.006	-0.005
	(0.168)	(0.296)	(0.151)	(0.209)	(0.089)	(0.104)	(0.139)	(0.261)
Constant	0.402***	0.381***	0.405***	0.392***	0.399***	0.386***	0.400***	0.360***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	10,951	10,951	10,951	10,951	10,951	10,951	10,951	10,951
Adjusted R^2	0.064	0.065	0.065	0.066	0.066	0.066	0.063	0.065

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 15: Effect of CEO Network Centrality on Pay-Performance Sensitivity

Panel regressions of Scaled Pay-Performance Sensitivity measure on CEO centrality levels are presented in Table 15. Scaled Pay-Performance Sensitivity is the log of Edman's et al. (2009) measure of dollar change in CEO wealth for a percentage change in firm value scaled by CEO annual pay. This measure is downloaded from Edman's website. Centrality is measured by Closeness in models 1 and 2, Degree in models 3 and 4, Betweenness in models 5 and 6, and Eigenvector in models 7 and 8. All other variables are as previously defined. All independent and control variable are lagged one period. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	-1.218***	-0.704***	-0.855***	-0.558***	-0.546***	-0.483***	-1.147***	-0.744***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Centrality^		-3.017***		-1.598***		-0.456		-2.940***
		(0.000)		(0.000)		(0.166)		(0.000)
Size	0.128***	0.161***	0.114***	0.134***	0.071***	0.079***	0.113***	0.148***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.006)	(0.002)	(0.000)	(0.000)
Profitability	2.415***	2.356***	2.487***	2.480***	2.533***	2.531***	2.444***	2.418***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.099***	-0.091***	-0.093***	-0.091***	-0.090***	-0.089***	-0.100***	-0.092***
	(0.001)	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.001)	(0.003)
Capital Investment	0.754***	0.684***	0.708***	0.665***	0.677***	0.668***	0.772***	0.718***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Investment in Innovation	1.728**	1.546*	1.578*	1.455*	1.149	1.149	1.853**	1.773**
	(0.042)	(0.060)	(0.067)	(0.087)	(0.179)	(0.178)	(0.029)	(0.034)
R&D Missing	0.001	-0.011	0.017	0.009	0.035	0.031	0.009	-0.001
	(0.992)	(0.884)	(0.828)	(0.905)	(0.661)	(0.698)	(0.908)	(0.991)
Constant	1.394***	2.725***	1.228***	1.974***	1.341***	1.560***	1.449***	3.033***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	12,272	12,272	12,272	12,272	12,272	12,272	12,272	12,272
Adjusted R^2	0.146	0.173	0.139	0.149	0.134	0.135	0.144	0.163

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 16 : Effect of CEO Network Centrality on Pay-Performance Sensitivity after Controlling for Governance

This table includes the same panel regressions of Scaled Pay-Performance Sensitivity measure on CEO centrality level as presented in Table 15 but after controlling for firm governance. All variables are as previously defined. All control variables are lagged one year. All models include year and industry dummies. P-values are in parentheses. Robust standard errors are clustered at the firm level.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
	Closeness		**Degree**		**Betweenness**		**Eigenvector**	
Centrality	-0.682***	-0.472***	-0.340***	-0.197	-0.364***	-0.318***	-0.635***	-0.468***
	(0.000)	(0.001)	(0.007)	(0.138)	(0.001)	(0.007)	(0.000)	(0.001)
Centrality^		-1.355***		-0.807***		-0.346		-1.325***
		(0.000)		(0.000)		(0.120)		(0.000)
Size	0.256***	0.266***	0.239***	0.246***	0.233***	0.237***	0.249***	0.261***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Profitability	2.389***	2.387***	2.437***	2.449***	2.431***	2.435***	2.400***	2.403***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.112***	-0.106***	-0.108***	-0.106***	-0.107***	-0.106***	-0.113***	-0.108***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Capital Investment	0.487***	0.462***	0.449***	0.433***	0.448***	0.444***	0.494***	0.473***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Investment in Innovation	2.760***	2.680***	2.588***	2.535***	2.512***	2.518***	2.833***	2.797***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.000)	(0.001)
R&D Missing	-0.017	-0.020	-0.003	-0.006	0.001	-0.002	-0.014	-0.015
	(0.775)	(0.737)	(0.956)	(0.915)	(0.991)	(0.968)	(0.822)	(0.802)
Intense_Monitoring	0.003	0.006	0.009	0.012	0.013	0.013	0.001	0.002
	(0.944)	(0.877)	(0.813)	(0.753)	(0.721)	(0.726)	(0.979)	(0.959)
Small_Board	0.103**	0.088*	0.106**	0.097**	0.115**	0.111**	0.108**	0.097**
	(0.031)	(0.067)	(0.028)	(0.043)	(0.017)	(0.021)	(0.025)	(0.044)
CEO_not_Chairman	-0.127***	-0.099**	-0.126***	-0.113**	-0.129***	-0.127***	-0.123***	-0.109**
	(0.004)	(0.023)	(0.005)	(0.012)	(0.004)	(0.005)	(0.005)	(0.013)

Low_Entrenchment	0.145***	0.146***	0.145***	0.147***	0.145***	0.146***	0.148***	0.147***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Older_CEO	0.057	0.057	0.061	0.071	0.066	0.076*	0.053	0.044
	(0.186)	(0.184)	(0.163)	(0.101)	(0.131)	(0.081)	(0.221)	(0.311)
Block_Ownership	0.869***	0.848***	0.881***	0.873***	0.880***	0.878***	0.869***	0.850***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
High_CEO_Ownership	1.042***	0.999***	1.056***	1.035***	1.064***	1.059***	1.048***	1.021***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.818***	-0.157	-0.950***	-0.548**	-0.888***	-0.714***	-0.802***	-0.035
	(0.001)	(0.570)	(0.000)	(0.035)	(0.000)	(0.007)	(0.001)	(0.909)
N	10,288	10,288	10,288	10,288	10,288	10,288	10,288	10,288
Adjusted R^2	0.350	0.355	0.346	0.348	0.347	0.347	0.349	0.353

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

III. CEO NETWORK CENTRALITY AND MERGER PERFORMANCE

Abstract: We use director relational data from BoardEx to construct social networks of executives and directors of US public companies and calculate four measures of network centrality: Closeness, Degree, Betweenness, and Eigenvector centrality for each individual connected into such network. CEOs with higher levels of network centrality may obtain more private information from their social contacts, which could translate to better decision-making on the job (private information hypothesis). On the other hand, more centrally positioned CEOs may derive influence and power from being well-connected and thus be more insulated from disciplinary actions brought about by the corporate control market and the executive labor market (managerial entrenchment hypothesis). By studying outcomes of M&A's, we introduce evidence that supports the managerial entrenchment hypothesis. More centrally positioned CEOs are more likely to bid for other publicly traded firms, and these deals carry greater value losses to the acquirer, and greater losses to the combined entity. Stronger corporate governance in the form of intensive board monitoring, non-CEO Chairman, and block ownership at the bidder company can partially mitigate such effects. Following the CEOs and their firms five years after their first value-destroying deals, we find that firms run by more centrally positioned CEOs withstand the external threat from market discipline. Moreover, the managerial labor market is less effective in disciplining centrally positioned CEOs because they are more likely to find alternative, well-paid jobs. Ultimately, we show that CEO personal networks can have their "darker side" – well-connected CEOs may become powerful enough to pursue any acquisitions, regardless of the impact on shareholder wealth.

1. Introduction

A new strand of research in corporate finance looks at the intensive web of social

connections of corporate executives and board members of America's publicly traded companies, and asks whether such connections are economically relevant and significant in affecting firm governance, financial contracting, and firm values. The findings have been substantial. For example, studying within-firm connections, Fracassi and Tate (forthcoming) show that CEOs have the incentive to appoint directors with ties to the CEO and that the CEO-director connections weaken board monitoring and destroy corporate values. Hwang and Kim (2009) further show that firms with board members socially tied to the CEO award higher CEO compensations, and are associated with lower pay-performance sensitivity, as well as lower turnover-performance sensitivity. Coles et al. (2010) shows similarly lower turnover-performance sensitivity and higher pay for boards where more members come after the CEO's appointment, although they find board co-option to be value enhancing for high human capital intensity firms.

We find these results enlightening. On the other hand, we contend that the above studies may have missed an important intermediate step, which ties the observation that directors and CEOs are "socially connected" to the ultimate outcome that "connected" directors become submissive to CEOs' demands. This missing step should readily explain why social connections could generates costs of poor monitoring, firm value losses, or the implicit loss of CEO or directors' reputation as guardians of shareholders' interests.

We therefore take a different view at the social networks of CEOs and directors: instead of checking whether a CEO is connected to a director on the board, we study the overall connectedness of CEOs and directors and use measures of *network centrality* to capture the status, influence, and power of a CEO with respect to the *entire* network he or she is linked to. Similar to all prior studies, the social network is formed through shared past employment in

executive and director positions, alumni educational network affiliation, or directorship in social clubs. We use four centrality measures commonly found in social network studies: degree, closeness, betweenness, and eigenvector centrality, to quantitatively gauge one's position in a network, and argue that network centrality conveys power and influence, the key element driving the results in prior studies.

In this paper, we apply the CEO network centrality measures to mergers and acquisitions. M&As are some of the most crucial corporate events for bidding firms and their CEOs. In addition, M&A events set the stage for CEOs to showcase their network influence both internally, when they persuade directors to support CEO decisions in initiating possibly value-destroying deals, and externally, as well-networked CEOs may obtain and utilize private information from their network contacts to aid in bidding and negotiation. The broad, interdisciplinary literature on social network cannot distinguish "power and influence in bargaining and negotiation" and "power derived from better access to information" (Hanneman and Riddle, 2010, Chapter 10), and our approaches in focusing on M&A outcomes present convincing statistical evidence to separate the two hypotheses.

We investigate not only the role of bidder CEO's personal network size (the number of direct links between the CEO and other individuals) but also the impact of "importance" of the CEO's network (how short a path the CEO has to other individuals, how often the CEO lies on the shortest path between two individuals, and how "relevant" the individuals linked to the CEO are)[20]. Social science research suggests that better-connected (i.e. more central) individuals are

[20] The focus on CEOs' *entire* social network and the centrality of network positions also differs our study from other M&A papers, such as Cai and Sevilir (forthcoming) who show that cross-firm social links can be valuable during mergers and acquisitions (M&A). Their study suggests that bidders and targets sharing a common board member negotiate deals with better merger performance, due to reduction in information asymmetry between the bidder and the target.

more influential and/or powerful (e.g. Mizruchi and Potts 1998). We strive to link the potential bidder CEO influence and power to M&A outcomes in order to answer the following two research questions: Are bidder firms with well-connected CEOs associated with higher/lower frequency of M&A deals? Are M&A deals involving bidder firms with well-connected CEOs characterized by higher/lower takeover gains (especially to bidder shareholders) and by higher/lower total takeover synergies? Ultimately, we want to examine the potential "darker side" of CEO personal networks – that is, whether personal networks can make the CEO powerful enough to withstand internal and external monitoring, and to pursue acquisitions regardless of the shareholder wealth impact.

The role of the CEO during merger negotiations is crucial, since M&A transactions can often lead to significant losses – both for the bidder shareholders and in terms of total takeover synergies (e.g. Andrade et al., 2001; Moeller et al., 2005, 2004). Equally importantly, personal networks are worth studying because it is not certain whether shareholders can benefit from the bidder CEO's overall connectedness. Deals initiated by well-connected bidder CEOs can still lead to shareholder gains thanks to lower information asymmetry during M&A process, as argued by Cai and Sevilir (forthcoming). On the other hand, it is possible that well-connected CEOs can utilize their higher influence and/or power to increase their entrenchment by insulating themselves from the market for corporate control and the managerial labor market. Since entrenched managers are more likely to pursue corporate activities that will benefit themselves at

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Similarly, Schonlau and Singh (2009) find that better connected and networked boards are associated with superior post acquisition performance due to the easier access to information. On the other hand, Ishii and Xuan (2010) claim that social ties between the acquirer and the target could lead to poorer decision making resulting from weaker critical analysis, lower due diligence, and social conformity. Chikh and Filbien (2011) also show that French CEOs with sizable personal networks are more likely to complete acquisitions even if they are met with a negative market reaction upon the announcement.

the expense of shareholders (e.g. Bebchuck et al., 2011; Masulis et al., 2007; Shleifer and Vishny, 1989), well-connected bidder CEOs may get engaged in value-destroying M&A deals.[21] We expect that if more central bidder CEOs can shield themselves from the market for corporate control, then value-destroying bidder firms will not face a high chance of being subsequently acquired.[22] Liu (2010) shows that more central CEOs are also less likely to be disciplined by managerial labor market – even though such CEOs are associated with more frequent turnover, they are also more likely to be quickly re-employed (without a decline in compensation). In addition, we test whether more central CEOs are able to use their influence and power to decrease the likelihood of forced turnover following bad performance – we expect to find lower sensitivity of forced CEO turnover to previous negative bidder abnormal acquisition returns.[23]

We utilize BoardEx database to construct personal social networks of CEOs of US firms and find the following results describing the propensity of S&P1500 companies to acquire US public targets during the period from January 2000 to December 2009:

- Higher acquirer CEO centrality is associated with more frequent acquisitions. Increasing CEO centrality from the 25th to the 75th percentile of the sample increases the relative

[21] There are many reasons why bidder CEOs may benefit from value-destroying M&A deals. Most importantly, due to separation of ownership and control, CEOs are likely to accrue the full value of private benefits of the acquisition, while bearing only partial value of the losses associated with the deal. The examples of private benefits include, for example: higher post-merger managerial compensation due to the increase in firm's asset base (Jensen and Murphy, 1990), post-merger compensation packages insensitive to negative stock performance (Harford and Li, 2007) smoother post-merger earnings, leading to the lower likelihood of financial distress (especially in case of diversifying acquisitions – Berger and Ofek, 1996), and by pursuing mergers that involve manager-specific investments (making it costly for shareholders to replace the CEO – Shleifer and Vishny, 1989).

[22] Our argument is based on results of Mitchell and Lehn (1990), who show that bidders involved in acquisitions destroying shareholder values are significantly more likely to be acquired during the five year following the completed M&A deal.

[23] Lehn and Zhao (2006) find evidence of the disciplining effect of the managerial labor market on bidder CEOs– they show that the likelihood of forced CEO turnover substantially increases following a deal destroying the bidder shareholder value.

frequency of acquisitions by 25.3%, on average.

- Acquisition abnormal returns to bidder shareholders are negative in deals initiated by bidder CEOs with above-median centralities. In addition, increasing CEO centrality from the 25th to the 75th percentile of the sample decreases the acquirer cumulative abnormal returns, on average, by 3.38%.
- Total takeover synergies (measured by the weighted average of bidder and target shareholder abnormal returns) are negative in deals initiated by bidder CEOs with above-median centralities. The total synergies from the acquisitions are negative. In addition, increasing CEO centrality from the 25th to 75th percentile of the sample, decreases total synergies, on average, by 3.04%.
- Increasing bidder CEO centrality is positively associated with target shareholder abnormal returns. Increasing CEO centrality from the 25th to 75th percentile of the sample increases gains to the targets by 5.56%, on average.
- More efficient bidder corporate governance (intense monitoring boards, presence of large blockholders, higher CEO ownership, older CEO managing the firm) can partially mitigate the high frequency of acquisitions by bidders with more central CEOs.
- Whereas pursuing value-destroying deals increases the likelihood of the bidding firms being subsequently acquired within a 5 year period after the first value-destroying deal, high bidder CEO centrality significantly diminishes the strength of the link between past negative merger performance and subsequent bidder firm acquisition likelihood.
- The managerial turnover for more central bidder CEOs is higher, regardless of the performance. However, well-connected CEOs (compared to CEOs with low centrality) are more likely to be appointed into another CEO position. In addition, the magnitude of

bidder shareholder losses is unrelated to the likelihood of forced turnover within 5 years of their first value-destroying deal for well-connected CEOs, while the forced turnover is more likely after value destroying deals for CEOs with below-median centrality.

Our findings are consistent with social science studies that view centrality as the source of influence and power (e.g. Mizruchi and Potts 1998; Brass and Burkhardt 1992). Well-connected bidder CEOs are able to insulate their firms from the market for corporate control and to withstand the external threat of being taken over. In addition, those CEOs are also unlikely to be disciplined by the managerial labor market. First, following their departure, they are more-likely to find another CEO position (our results are consistent with Liu, 2010). Second, the likelihood of their forced turnover is not significantly related to potential value destruction during past M&A deals – that is, they are unlikely to be fired due to completing a bad merger deal. Ultimately, more central bidder CEOs can achieve greater managerial entrenchment, which may lead to poorer decision making (more specifically, decisions benefiting managers at the expense of shareholders) and value-destroying deals (e.g. Masulis et al. 2007, Bebchuck et al. 2011), especially if the governance of their own firm is weak. We believe that our study is among the first to document the "darker side" of personal networks. That is, CEOs who achieve substantial power and influence thanks to their personal networks may withstand both internal (board) and external (the market for corporate control) monitoring. This will allow them to pursue acquisitions benefitting bidder CEOs (possibly in terms of higher compensation insensitive to value losses – Jensen and Murphy, 1990; Harford and Li, 2007), while the acquisitions may not benefit bidder shareholders and may fail to deliver positive takeover synergies.[24] This effect

[24] We do not claim, though, that CEO personal networks are always facilitating value destruction. It is possible that for non-central CEOs, increases in CEO centrality may be beneficial. However,

should be particularly strong in bidding firms characterized by weak corporate governance.

Our finding survives a battery of robustness checks. For example, it is possible that higher acquisition frequency combined with the losses to bidder shareholders can also be in part explained by overconfidence/hubris (Roll, 1986) possibly displayed by well-connected bidder CEOs. However, it should be noted that the impact of the CEO centrality in all of our key results (the likelihood of acquisitions, the acquisition gains, the likelihood of subsequent firm takeover and the likelihood of CEO turnover) is virtually identical when we specifically control for the measures of CEO (over)confidence (Malmendier and Tate, 2008; Campbell et al., 2011). Also, our findings of the absence of the link between bidder firm value destruction and the likelihood of subsequent acquisition or forced CEO turnover are all pointing to bidder CEO entrenchment as the primary explanation of value-destructive tendencies. Last, since well-connected CEOs are likely able to compare/discuss their decisions with social peers in their personal networks[25], the overconfidence/hubris tendencies (leading to overbidding or overpaying for the targets) may in fact be constrained for more central bidder CEOs.

The paper proceeds as follows: In Section 2 we discuss social network centrality measures and why they should matter in corporate M&A transactions and outcomes. We then present our key hypotheses. Section 3 describes the data and variable construction. Section 4 presents the empirical results and various attempts to check robustness. Section 5 investigates whether the strength of internal corporate governance metrics and the efficiency of external corporate control market and executive labor market could mitigate the effect of CEO centrality

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the results of our paper may be influenced by the fact that we focus on the CEOs of S&P 1500 firms. Our results show that S&P 1500 CEOs are more central compared to the "typical" U.S. executives. Furthermore, we also document that the centrality of S&P 1500 bidder CEOs is even higher than the centrality of the other (non-acquiring) S&P 1500 CEOs.

[25] Shue (2011) shows that CEOs catch up to peers on salaries and bonuses after attending Harvard MBA Alumni gathering events.

on merger performance. Section 6 concludes.

2. Network Centrality and M&A Outcomes

2.1.CEO Network Centrality

In social networks, individuals (nodes) form links to other individuals, and the links and nodes form the network (Jackson, 2010). The position of each node in the network is not random (Jackson and Roberts, 2007) and some positions assume power when they (1) link to more individuals; (2) are close to all other individuals; (3) are on the shortest path connecting any other pairs of individuals; and (4) are more linked to other highly-linked-to individuals (Padgett and Ansell, 1993). "Power" in a network carries at least two different dimensions (Hanneman and Riddle, 2005, Chapter 10): First, a network-powerful individual may be better positioned for information, as her position allows her to reach other individuals most efficiently. Second, a well-networked individual may assume advantage in bargaining and negotiation, as her network positions allows more opportunities or fewer constraints. These two dimensions are not easily distinguishable conceptually, as we are not able to pinpoint the nature of relationships in each link. However, by observing the outcome of how individuals exert power in major events, we may be using the outcome of events to distinguish these dimensions.

Our CEO network is constructed to include all known connections of a CEO through common, past and current, education, employment, and social activities. Four common measures of centrality are constructed: Degree centrality, Closeness centrality, Betweenness centrality, and Eigenvector centrality (Proctor and Loomis 1951; Sabidussi 1966; Freeman 1977; Bonacich 1972). Degree centrality is the number of direct ties an individual has. It represents a count of the number of direct relations an individual has with other individuals in the network. The more connections the individual holds, the more popular this individual is in the network. Closeness

centrality is the inverse of the sum of shortest distance between an individual and all other individuals in a network. Thus it presents how near an individual is from all other individuals and indicates how efficiently this individual can obtain information from everyone else in the network. Betweenness centrality measures how often and individual lies on the shortest path between any other members of the network. Hence, it indicates how much control an individual could have on the flow of information, because if an individual is between two other individuals, this person could either interrupt or facilitate the information flow between the other two individuals. Eigenvector centrality is a measure of the importance of an individual in the network. It takes into account the importance of the individuals that the individual is connected to in the network.

2.2.Bidder CEO Centrality and the Likelihood of Acquisitions

Mergers are one of crucial corporate events for bidding firms. The acquirers may gain, or lose, substantial value during and after the announcement of the merger (e.g. Andrade et al., 2001, Moeller et al., 2004, 2005). The bidder CEO skills, attributes, and personal traits play a key role during the M&A process (e.g. Malmendier and Tate, 2008; Masulis et al., 2007; Harford and Li, 2007; Lehn and Zhao, 2006). Consequently, the size and importance of bidder CEO personal networks should affect the course of acquisitions.

In the context of M&A, highly networked CEOs may either help or hurt the merger performance. On the one hand, Cai and Sevilir (forthcoming) show that cross-firm social links between the bidder and the target lead to better merger performance due to the reduction of information asymmetry. Similar information asymmetry-reducing benefits due to well-connected boards have also been documented by Schonlau and Singh (2009). The benefits of cross-connections have been documented even for mutually independent entities (e.g. Fracassi, 2009).

Engelberg et al. (2009) further show that CEOs command higher salaries if they are able to connect to executives or directors of other firms. Ultimately, since personal networks can be considered a union of all bilateral ties a person creates, well-connected CEOs can have better and easier access to valuable information about potential targets, leading to lower information asymmetry and more efficient acquisition decisions.

On the other hand, social science research has identified connectedness – that is, high centrality – as the source of influence and power (e.g. Mizruchi and Potts 1998).[26] For M&A this may imply that well-connected CEOs can utilize their social ties to entrench themselves and to mitigate monitoring of their activities. Fracassi and Tate (forthcoming) and Hwang and Kim (2009) show that CEO social ties to their firm's board members reduce the effectiveness of board monitoring. Studying the direct impact of CEO networks on M&A outcomes, Chikh and Filbien (2011) show that French CEOs with sizable personal networks are less likely to cancel acquisitions even if they are met with a negative market reaction upon the announcement. Ishii and Xuan (2010) also claim that cross-firm bidder-target social ties lead to value losses due to weaker critical analysis, lower due diligence, and social conformity. Ultimately, increased entrenchment and insulation from monitoring can allow well-connected bidder CEOs to pursue frequent acquisitions, even at the expense of bidder shareholders. This may happen due to a variety of reasons – e.g. higher post-merger compensation due to higher post-merger asset base (Jensen and Murphy, 1990), post-merger compensation insensitive to stock price declines (Harford and Li, 2007), lower chance of financial distress due to diminished earning fluctuation in case of diversifying acquisitions (Berger and Ofek, 1996), or increased costs of CEO replacement in case of mergers creating entities that require manager-specific investment

[26] Traditional research in network analysis document that centrality is a source of social power and define them as identical (see for example Brass and Burkhardt 1992).

(Shleifer and Vishny, 1989).

Last, more confident people are more likely to form additional social ties, so sizable and/or influential CEO personal networks may proxy for CEO (over)confidence, optimism or hubris. Since financial research has documented that overconfident (or too optimistic) CEOs tend to pursue acquisitions more frequently (e.g. Malmendier and Tate, 2008; Roll, 1986), then well-connected CEOs (who built their personal networks thanks to their confidence and/or optimism) may indeed bid more frequently.

Ultimately, all the three above-discussed potential consequence of being well-connected – lower information asymmetry, increased entrenchment due to CEO's influence or power, and CEO overconfidence – should lead to a higher incidence of acquisitions performed by more central bidder CEOs. Consequently, the first hypothesis tested in our study is:

H1: Greater bidder CEO centrality should be associated with the higher likelihood of completed acquisitions.

2.3.Bidder CEO Centrality and Acquisition Gains

Even though bidder CEO centrality should be positively associated with the frequency of completed acquisitions, the value impact of the acquisitions – especially for the bidder shareholders – should be different for the three consequences of CEO connectedness discussed in the previous section. Financial research has traditionally associated lower information asymmetry with value improvements and with better managerial decisions, implying that acquisitions completed by well-connected bidder CEOs may lead to greater gains to bidder shareholders and to greater total takeover synergies (measured as the combined gains to the bidder and the target shareholders). Sources of competitive advantage gained from central positions of acquirer CEOs include access to private information about targets that results in

better evaluation of deals and hence acquiring "bargains".[27] In addition, social science and management research documents the importance of central positions in a network in gaining better access to information and knowledge transfer (e.g. Freeman 1979; Tsai 2001).

On the other hand, potential stronger bidder CEO entrenchment (due to strong CEO power and influence) generally leads to poor decision making and value losses (e.g. Masulis et al. 2007, Bebchuck et al. 2011). Similarly, bidder CEO overconfidence and hubris have been documented to destroy value (Malmendier and Tate, 2008), often leading to forced CEO turnover (Campbell et al., 2011). Ultimately, the impact of bidder CEO centrality on bidder shareholder and total synergy gains is an empirical issue, and the second hypothesis tested in our study is:

H2 [H2A]: Greater bidder CEO centrality should be associated with lower [higher] bidder shareholder acquisition gains (measured by abnormal acquisition returns) and with lower [higher] total takeover synergies (measured as the combined abnormal acquisition returns to the bidders and the targets). The bidder shareholder gains and the total takeover synergies should be negative [most positive] for the acquisitions completed by most-central bidder CEOs.

2.4.Bidder CEO Centrality and Internal Corporate Governance

Financial research has documented the power of corporate governance to monitor CEO performance and to limit potentially adverse impact of CEO actions. Faleye et al. (2011) show that boards where the majority of independent board members qualify as "intense monitors" (the members serve on at least two of the three principal monitoring committees) display superior monitoring performance. Yermack (1996) suggests that bigger boards are generally considered poorer monitors. Bebchuk et al. (2011) and Masulis et al. (2007) document that entrenched managers make more frequent acquisitions. Higher ownership concentration in the form of block

[27] Bruner (2004) documents that board networks lead to more efficient deals due to less costs of searching for and evaluating targets.

holdings (above 5%) or greater share of CEO ownership is generally associated with improved monitoring (Shleifer and Vishny, 1997), though high CEO ownership can also facilitate entrenchment (Morck et al., 1988). On the other hand, CEO-Chairman duality leads to greater extraction of rents from shareholders (Bebchuk and Cohen, 2005). CEO age can have both positive (Milbourn, 2003) or detrimental (Hermalin and Weisbach, 1998) effect on the quality of managerial decisions.

Strong corporate governance is not needed to mitigate the effects of CEO centrality if acquisitions initiated by more central CEOs lead to takeover gains. On the other hand, if greater bidder CEO centrality is associated with losses to bidder shareholders and lower takeover synergies, strong corporate governance should constrain the CEO actions and to limit the acquisition losses. Consequently, the third hypothesis tested in our study is:

H3: Conditional on greater bidder CEO centrality being associated with lower bidder shareholder acquisition gains and with lower total takeover synergies, stronger internal corporate governance (intense monitoring and/or smaller board, concentrated share ownership, absence of CEO-Chairman duality, longer CEO tenure, absence of anti-takeover provisions in firm charter) should be associated with (a) lower likelihood of completed acquisitions and (b) less negative takeover gains in acquisitions initiated by bidding firms with more central CEOs.

2.5.Bidder CEO Centrality and the Market for Corporate Control

Mitchell and Lehn (1990) show that the market for corporate control can discipline poorly-performing bidder CEOs. That is, bidder companies involved in acquisitions destroying bidder shareholder values are more likely to be acquired during the five year following the completed M&A deal. Mitchell and Lehn (1990) document that the bidder abnormal acquisition return is a significantly negative determinant of bidding company's likelihood to be subsequently acquired

(which means that negative bidder abnormal returns actually *increase* acquisition likelihood).

We expect that *if* the acquisitions completed by well-connected bidder CEOs destroy value and *if* the value losses are due to stronger bidder CEO entrenchment, then the bidder CEOs are likely to use their influence and power to insulate themselves from the market for corporate control. That means, we expect the sensitivity of bidder abnormal acquisition returns in models explaining the subsequent bidder firm acquisition likelihood to decline for the sample of well-connected bidder CEOs. Consequently, the fourth hypothesis tested in our study is:

H4: In the sample of bidders with more central CEOs (compared to the sample of bidders with less central CEOs), the bidder abnormal acquisition return should be a less positive determinant of the likelihood the bidder will be subsequently acquired.

2.6.Bidder CEO Centrality and the Managerial Labor Market

Lehn and Zhao (2006) find the disciplining effect of the managerial labor market on bidder CEOs. Their key model shows that the bidder acquisition abnormal return is a significantly negative determinant forced bidder CEO turnover during the five years following the acquisition (which means that negative bidder abnormal returns actually *increase* the likelihood of forced turnover).

Once again, we expect that *if* the acquisitions completed by well-connected bidder CEOs destroy value and *if* the value losses are due to stronger bidder CEO entrenchment, then the bidder CEOs are likely to use their influence and power to insulate themselves from the managerial labor market and reduce the likelihood they will be fired "for a cause" (that is, due to a bad merger deal). Thus, for the well-connected bidder CEOs, the bidder abnormal acquisition return should be a less significant determinant of the likelihood of the forced CEO turnover after the completion of the merger.

On the other hand, the high CEO centrality may be either positively or negatively associated with the *overall* (i.e. not performance-related) probability of the CEO turnover. On the one hand, well-connected CEOs can simply utilize their influence and power to limit the board ability to fire them for any reason. On the other hand, Liu (2010) shows that terminated well-connected CEOs are more likely to find another well-paid, similarly reputable job, regardless the reason of their previous dismissal. Ultimately, the impact of bidder CEO centrality on the overall likelihood of forced CEO turnover is an empirical issue, and the fifth hypothesis tested in our study is:

H5 [H5A]: In the sample of bidders with more central CEOs (compared to the sample of bidders with less central CEOs), the bidder abnormal acquisition return should be a less positive determinant of the likelihood of the forced CEO turnover after the completion of the merger.

[H5B] Higher bidder CEO centrality should increase the likelihood of overall CEO turnover. If well-connected bidder CEOs are more likely to be replaced, then they should be more likely to find another CEO-equivalent (i.e. CEO or Chairman) job after their dismissal (compared to less central CEOs).

3. Data

3.1. CEO Centrality Data

Information about the educational background, prior employment, and other social memberships of directors and executives of US public companies is obtained from BoardEx. In our main analysis, we construct network based on employment history only in listed firms. This information is the most reliable and can be cross-verified in other sources. In addition, we use the entire network built from overlaps in education, employment, and social activities to conduct robustness.

The network based on listed firms includes 12 million links formed between 1938 and 2010, and a maximum network of 314,416 individuals in 2010. [28] We calculate four common measures of centrality in the social network literature: Degree centrality, Closeness centrality, Betweenness centrality, and Eigenvector centrality (Proctor and Loomis 1951; Sabidussi 1966; Freeman 1977; Bonacich 1972). Degree centrality is the sum of direct ties an individual has in each year. Closeness centrality is the inverse of the sum of shortest distance between an individual and all other individuals in a network. Betweenness centrality measures how often and individual lies on the shortest path between any other members of the network. Eigenvector centrality is a measure of the importance of an individual in the network. It takes into account the importance of the individuals that are connected in the network. The computation is daunting and requires storing information for each and every possible pairs of nodes (nearly 250,000 for year 2005 and nearly 300,000 for year 2008 and later) in computer memory, and the Matlab program for closeness, for example, takes about 7 days to process the graph of 2010, on supercomputers with at least 84G of memory[29].

We then select the yearly measures of centrality for S&P1500 CEOs for the period spanning from 1999 to 2008. The centrality variables are available for 4006 CEOs in 16415 firm-year observations.

The summary statistics for all centrality measures for all S&P 1500 firms are presented in the Appendix. We calculate not only the raw centrality measure, but also the percentile rankings of

[28] We conduct robustness checks to alter the network by adding additional restrictions. One restriction is to ensure strength of connections, in which we only include links that last 3 years or longer. Another restriction is to drop inactive connections, in which any links that have not been active in the past 5 years out of the sample. Yet another robustness round combines the two restrictions. Our results are mostly unaffected by these restrictions.

[29] This project would not have been possible without the "Star of Arkansas" supercomputer and the support from Arkansas High Performance Computing Center.

the CEOs based on their position in the network of *all* (that is, not just S&P 1500) executives and directors of US public companies in the whole BoardEx database. The summary tables show a considerable differences in centrality measures for the S&P 1500 CEOs, ranging from extremely well-connected individuals (The maximum Degree centrality is 1,985) to CEO without any significant links (the minimum Degree centrality is 2, the minimum Betweenness and Eigenvector is 0). Not surprisingly, though, the typical S&P 1500 CEO is more central compared to the typical BoardEx executive. Based on the medians of the four considered centrality measures, the S&P 1500 CEOs range from the 73th (Closeness) to the 84th (Betweenness) percentile of the overall distribution.

Table 1 presents the firm statistics for the S&P 1500 companies – both for the full sample first and divided into Below versus Above Median groups based on the four centrality measures (Closeness, Degree, Betweenness, Eigenvector) of the firm's CEO. We define Size as the log of total assets, Tobin's Q as the sum of market value of equity (end of year price per share * number of shares outstanding at the end of year), short term debt, long term debt and preferred stock, all divided by total value of assets. Profitability is measured as the return on total assets, leverage as the ratio of book value of debt to total assets, and liquidity as the ratio of operating cash flow to total assets. Using all measures of centrality, we find that firms with highly central CEOs are significantly larger, have higher Tobin's Q, are less profitable, and are more leveraged. However, there is no statistical significant difference between firms with high or low CEO centrality with respect to liquidity.

3.2.M&A Data

Our M&A sample contains all completed mergers between S&P1500 acquirers and U.S. public targets for the period spanning January 1st 2000 to December 1st 2009 – a total of 464

acquirers in 776 deals. We choose deals with publicly listed targets and acquirers because our measures of takeover gains (cumulative acquisition abnormal returns) require the availability of market prices. The data comes from the Securities Data Company (SDC) database. In addition, we obtain prices from CRSP and financial data from COMPUSTAT.

3.3.Internal and External Governance Data

To get the governance data for the CEOs and the directors in our sample, we merge the BoardEx data to Risk Metrics by using an algorithm that matches the names of the CEOs and firm's directors in BoardEx to the names available in Risk Metrics. We then search manually by hand for any non-matched names. In addition, we rely primarily on Risk Metrics in computing governance variables such as intense monitoring, board size, duality, age, block ownership and CEO ownership, but we also fill in any missing values from Execucomp. We also obtain the entrenchment index from Bebchuk, Cohen and Ferrell's entrenchment index[30]. We have complete governance data available for 3283 CEOs in 13398 firm year observations.

4. Results

4.1.Bidder CEO Centrality and the Likelihood of Acquisitions

Table 2 presents the number of acquisitions of successfully acquired US public targets by the 464 bidders in the sample classified by year of acquisition announcement. The date of acquisition announcement is the original date of announcement as reported by SDC. Our data is presented for the full sample (panel A) as well as for the subsamples Below Median vs. Above Median based on the centrality of the acquirer's CEO in the year before the merger announcement (panels B-E, based on the four considered centrality variables). (Below/Above Median is defined as below/above sample median.) The results of Table 2 suggest that during the

[30] We are grateful to Lucian Bebchuk who made the entrenchment index available at www.law.harvard.edu/faculty/bebchuk/data.shtml

sample period, acquirers lead by CEOs with more central networks (based on all four measures) complete significantly more deals.

In Table 3, we present tests of the differences in centrality measures between S&P 1500 acquirer and non-acquirer CEOs. Our results show that means of centrality measures are significantly higher for acquirer CEOs. In terms of percentiles describing the whole BoardEx population, the acquirer centrality means for Closeness/Degree/Betweenness/Eigenvector are 75.69/83.66/84.10/82.61, while the mean centrality for non-acquirers is 67.54/71.08/75.70/73.43. These differences are significant at 1% level for all measures of centrality.[31] This means that among S&P 1500 firms, bidder CEO centrality is on average very high, exceeding the centrality of other S&P 1500 (non-acquiring) CEOs (who in turn are still more central that the median executives in BoardEx sample).

Previous financial research suggests merger outcomes are impacted by differences in variables such as firm size (for example Moeller et al. 2004), market to book value (e.g. Asquith et al. 1983), leverage (e.g. Palepu, 1986, Billet et al. 2004), profitability (e.g. Lang et al., 1991), or liquidity (e.g. Smith and Kim, 1994). Table 1 suggests that firms ran by CEOs associated with different centrality levels may display significant differences in the above mentioned firm characteristics. So, to examine whether CEO centrality has an effect on the likelihood of acquisitions we control for other financial variables in the following Probit model:

$$P\,(Deal=1) = a_t + B_1 Centrality_{t-1} + B_2 Tobin'sQ_{t-1} + B_3 Liquidity_{t-1} + B_4 Profitability_{t-1} + B_5 Size_{t-1} + B_6 Leverage_{t-1} + e_t \quad (1)$$

[31] Since the non-acquirers' group is larger than the acquirers' group, we conduct a test of unequal variances. The F-value for the test of unequal variances is significant when using Degree and Betweenness centrality, thus we conduct a Wilcoxon rank test and the Z-values of the test confirm the statistical significant difference between the high and low centrality groups.

Where: Deal is a dummy variable that equals 1 if the acquirer announces an acquisition that is successfully completed and zero otherwise, Centrality is the percentile ranking of the acquirer's CEO centrality measured by Closeness, Degree, Betweenness, and Eigenvector centrality as previously defined in section 3.1. All other variables are as previously defined. All variables in the model are lagged one year compared to the acquisition announcement year.

The results of our analysis are presented in Table 4. Model 1 shows the results of the estimation without including the centrality variable. CEO centrality is measured by Closeness in Model 2, Degree in Model 3, Betweenness in Model 4, and Eigenvector in Model 5. Model 1 suggests, consistently with previous research, that large firms with higher growth opportunities, more cash flows, and lower leverage are more likely to be the bidders in completed M&As.

Controlling for firm characteristics, CEO centrality measured by Closeness, Degree, Betweenness, and Eigenvector is statistically significant and positive at the 1% level in models 2, 3, 4, and 5. Our results strongly support Hypothesis H1. Firms with more central CEOs have higher probability in conducting acquisitions than firms with less central CEOs. Increasing CEO centrality from the 25^{th} to the 75^{th} percentile of the sample increases the relative frequency of making acquisitions by 25.3% on average, when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality.

The likelihood of mergers and acquisition should also be related to the quality of governance in the bidding firm. Consequently, in models 6-9, we repeat the analysis of Models 2-5, but add in governance controls for intense monitoring, board size, duality, entrenchment index, CEO age, and block ownership and CEO ownership. Intense_Monitoring is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise. An intensive monitor is an independent director who serves on both the audit and compensation

committee (Faleye et al., 2011). Board_Size is the size of the board of directors. Duality is a dummy variable that equals one if the CEO is also the chairman of the board and zero otherwise. Eindex is Bebchuk, Cohen and Ferrell's entrenchment index (2009) [32]. The E-index is constructed by adding 1 for the following six provisions: staggered boards, limits to shareholder bylaw amendments, poison pills, golden parachutes, and supermajority requirements for mergers and charter amendments. Age is the CEO's age. Block_Ownership is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise. CEO_Ownership is the percentage of shares owned by the CEO.

Our results suggest that several mechanisms typically linked to improved governance (namely – Intense Monitoring, absence of CEO-Chairman duality, CEO age, and higher CEO ownership) all tend to be associated with lower likelihood of acquisitions. However, even after controlling for the governance determinants, the coefficient on Closeness, Degree, Betweenness, and Eigenvector remains positive and is significant at the 1% level in models 7, 8, 9, and at the 10% level in model 6.

4.2.Bidder CEO Centrality and Acquisition Gains

To investigate the relation between CEO centrality and merger gains, we employ an event study to estimate daily cumulative abnormal returns (CARs) around the merger announcement using the standard market model.[33] Table 5 reports the CARs over the (-3, +3) day event window for the acquirer (Panel A), the combined firm (Panel B) and the target (Panel C). [34] We calculate CARs for the combined firm (that is, the estimate of total synergies generated by the takeover) as

[32] In unreported analysis, we also consider governance index (Gindex) as reported by Risk Metrics. Results remained virtually identical.
[33] We use the returns to the CRSP equally weighted index as the market portfolio. The results utilizing CRSP value weighted index were virtually identical.
[34] Using alternative windows such as (-1,+1) or (-5,+5) results in similar regression estimates.

the market value weighted average of CARs for the acquirer and CARs for the target. The returns are shown for the full sample first then divided into three groups based on the centrality of the acquirer's CEO. Group1 contains observations with the acquirer's CEO centrality is below the sample 25th percentile. Group 2 contains observations with the acquirer's CEO centrality is between the 25th and 75th percentile. Group 3 contains observations with the acquirer's CEO centrality above the sample 75th percentile.

The mean [median] CARs for the full sample is significantly negative -1.87% [-1.41%] for the acquirers, positive 0.68% [0.33%] for the combined firm, and significantly positive 27.39% [21.28%] for the target. Those figures are consistent with prior literature documenting significant positive abnormal returns to the target and combined firm and either negative or insignificant returns to the bidders (e.g. Andrade et al. 2001; Betton et al. 2008).

Even more importantly, Table 5 shows that that on average, bidding companies ran by well-connected CEOs (compared to companies with non-central CEOs) generate approximately 1.67% lower CARs for the bidder shareholders, approximately 2.71% lower combined CARs, and over 7.4% higher CARs for the target shareholders. Also, the combined CARs (i.e. the total takeover synergies) for the highly central CEOs are negative using all four measures of centrality. All differences in combined CARs between Group1 and Group3 are highly statistically significant.

The above results provide strong support for Hypothesis H2 – the high centrality of bidder CEOs appears to be value reducing (especially for the bidder shareholders), and potentially consistent with CEO entrenchment and/or overconfidence.

So far, we analyzed simple univariate differences in CARs for the sub-samples of bidding firms with high vs. low centrality of CEOs. In the following sections, we will analyze the CARs

in the context of multivariate models to determine if the negative relation between acquirer CEO centrality and bidder or combined gains holds even after controlling for determinants of acquisition CARs identified by the previous finance research.

4.2.1. Bidder CEO Centrality and Bidder Acquisition Gains

To investigate whether bidder CEO centrality impacts bidder acquisition CARs, we estimate the following OLS model after controlling for firm and deal characteristics: [35]

$$CAR\ (-3,+3) = a_t + B_1 Centrality_{t-1} + B_2 Size_{t-1} + B_3 Profitability_{t-1} + B_4 Tobin'sQ_{t-1} + B_5 Leverage_{t-1} + B_6 Liquidity_{t-1} + B_7 Deal\_Value_t + B_8 Same\_Industry_t + B_9 Stock\_Deal_t + e_t \quad (2)$$

where the dependent variable CAR (-3,+3) is the cumulative abnormal return for the acquirer over the (-3,+3) day event window, Deal_Value is the value of the acquisition as reported by SDC divided by the market value of the acquirer, Same_Industry is a dummy variable that equals one if the acquirer and the target are in related industries identified by similar 2 digit SIC code and zero otherwise, Stock_Deal is a dummy variable that equals 1 if the merger is entirely financed by stock and 0 otherwise. All other variables are as previously defined and are lagged one year. We also add fixed year effects and industry effects in all models.

The results of our analysis are presented in Table 6. Model 1 includes the typical variables that are known to impact the CARs of the acquirers (e.g. Moeller et al. 2004). Centrality of acquirer CEO is measured by Closeness in Model 2, Degree in Model 3, Betweenness in Model 4, and Eigenvector in Model 5. In Models 6-9, we add additional control variables to take into

[35] Controls for deal characteristics and fixed industry and year effects are included as previous literature document the impact of form of payment (see for example Fuller et al. 2002), industry relatedness (see for example Morck et al. 1990), and merger intensity of the industry (see for example, Schlingemann, 2002) on merger gains.

account the effect of firm's governance on CARs.

Most importantly, the coefficient on CEO centrality measures is negative in all models and statistically significant at the 1% level. Increasing CEO centrality from the 25th to the 75th percentile of the sample increases the losses to acquirers by -3.38% on average when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality in Models 2-5).[36] Similarly to our univariate results, the findings in Table 6 provide support for the Hypothesis H2, which suggests that bidder CEO centrality is negatively associated with the gains to bidder shareholders.

4.2.2. Bidder CEO Centrality and Total Takeover Synergies

Losses to acquirers are not necessarily an evidence of negative impact of CEO centrality on total takeover synergies, acquirers may be giving up some of their gains in order to attract the targets based on bidder's expectation of large total synergies resulting from those deals (Hietala and Kaplan, 2003). Thus, to test if bidder CEO centrality is associated with the total takeover combined CARs, we analyze the following OLS model where we regress cumulative abnormal returns for the combined firm on measures of CEO centrality of the acquirer and other control variables identified by previous research to influence total takeover synergies:

$$CAR\ (-3,+3) = a_t + B_1 Centrality_{t-1} + B_2 Combined\_Size_{t-1} + B_3 Combined\_Profitability_{t-1} + B_4 Combined\_Tobin'sQ_{t-1} + B_5 Combined\_Leverage_{t-1} + B_6 Combined\_Liquidity_{t-1} + B_7 Deal\_Value_t + B_8 Same\_Industry_t + B_9 Stock\_Deal_t + e_t \quad (3)$$

[36] The other determinants of bidder acquisition CARs have mostly the expected signs. Most importantly, more profitable acquirers are associated with gains to bidder shareholders, while stock deals and acquisition of large targets lead to bidder shareholder losses. Once again, centrality stays a significantly negative determinant of bidder abnormal returns even when controlling for governance determinants in Models 6-9. Interestingly, none of the governance mechanisms with the exception of Block Ownership (positive determinant) and CEO Ownership (Negative Determinant) are significantly related to bidder abnormal returns.

The dependent variable CAR (-3,+3) is the cumulative abnormal return over the (-3,+3) day event window for the combined firm, calculated as the market value weighted average of CARs for the acquirer and CARs for the target. Combined_Size is the log of total employees for the combined entity. Combined_Profitability, liquidity, leverage, and Tobin's Q are asset weighted averages of the profitability, liquidity, leverage, and Tobin's Q of the acquirer and the target. All variables are lagged one year and are as previously defined. We also include industry and year fixed effects in all of our models.

The results of our analysis are reported in Table 7. Model 1 includes traditional variables that are known to impact the CARs of the combined firm. Centrality of acquirer's CEO is measured by Closeness in Model 2, Degree in Model 3, Betweenness in Model 4, and Eigenvector in Model 5. Most importantly, the coefficients on measures of CEO centrality are negative and significant in all models at the 1% level. We add controls for governance in Models 6 to 9 and our centrality variables remain negative and significant at the 1% level in all models. Increasing CEO centrality from the 25th to the 75th sample percentile increases the losses to the combined firm by -3.04% on average, when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality. Similarly to our univariate results, the findings in Table 7 provide support for the Hypothesis H2, which suggests that bidder CEO centrality is negatively associated with total takeover synergies.

4.2.3. Bidder CEO Centrality and Target Acquisition Gains

To analyze whether bidder CEO centrality is associated with target CARs, we run an OLS model similar to equation (2) where the dependent variable is the cumulative abnormal returns for the target over the (-3, +3) day window, the explanatory variables are the acquirer CEO

centrality, as well as all other control variables as previously defined, but calculated for the target.

The results of our analysis are presented in Table 8. Most importantly, the coefficients on acquirer's CEO centrality are positive and significant in 3 out of 4 of our models. Increasing CEO centrality from the 25th to the 75th sample percentile increases the gains to the target by 5.56% on average when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality. Furthermore, after including controls for the governance of the acquirers in models 6-9, two of our centrality measures remain significant and positive. Overall, our findings suggest that while the well-connected bidder CEOs are associated with value losses for bidder shareholders and with declining value of total takeover synergies, target shareholders actually benefit during the acquisitions (possibly due to overpayment).

4.3.Robustness Checks

4.3.1. Bidder size effect

Moeller et al. (2004) show that bidder acquisition CARs are significantly related to bidder size. Table 1 in our study documents that bidder CEO centrality is also related to bidder size (more central CEOs are likely to manage larger firms). To control for the possibility that our centrality measure pick the potentially non-linear size effect, in the unreported analysis (available upon request) we control for the non-linear size effect utilizing three different methods: (a) addition of extra dummy for large bidder sizes, (b) adding a quadratic size variable or (c) splitting the sample based on the size of the bidding firm. Regardless the adjustment, the centrality variables in Table 4 and Tables 6-8 stayed significant, with unchanged coefficient signs. Consequently, it is unlikely that our results regarding CEO centrality are due to the bidder size effect.

4.3.2. Entrenchment or overconfidence?

This behavior can be explained by managerial entrenchment. Well-connected CEOs can use their power and influence attained through personal network to insulate themselves from internal or external monitoring. Bidder CEOs may thus end up pursuing acquisitions benefiting them, but harming the shareholders. On the other hand, our results are also consistent with bidder CEO overconfidence. Previous finance research has identified CEO overconfidence as a source of M&A losses (e.g. Roll 1986, Malmendier and Tate, 2008). If large personal social networks are built by overconfident, optimistic individuals, then we can indeed observe a negative relation between centrality and M&A gains. In order to differentiate between the two potential explanations, in the unreported analysis (available upon request) we specifically add a measure of overconfidence to our models in Tables 4-8. The overconfidence is a dummy variable equal to one for highly confident CEOs identified by Malmendier and Tate's (2008) model.[37] In none of the models on Tables 4-8, the inclusion of overconfidence measure changed the significance or sign of the centrality coefficients. The overconfidence variable dummy, on the other hand, failed to be significant if any of the models. Consequently, it is likely that our results regarding CEO centrality are less likely due to CEO overconfidence.

We also studied the direct link between the measures of centrality and overconfidence – both in terms of univariate tests and regression analysis of centrality determinants. Our (unreported, but available upon request) results suggest that centrality is negatively relate to overconfidence, further strengthening our argument that that higher likelihood of acquisition and lower acquisition gains are mainly due to connectedness, rather than overconfidence.

4.3.3. Strength of ties forming CEO centrality

[37] Malmendier and Tate (2008) study CEO's personal portfolio choices. Confident CEOs tend to hold (rather than optimally sell) their highly in-the-money vested options.

We studied various alternative determinants of CEO centrality. For example, we considered the link between two people valid only if the relationship existed for at least three years, if the relationship was/was not based on a particular activity (education only, membership in social clubs), etc. Using all those alternative variable definitions lead to nearly identical results when compared to those presented in Tables 4-8.

4.3.4. CEO Centrality and CEO connection to Board Members Inside the Firm

Existing finance research has already documented the detrimental effect of direct ties between CEOs and board members of their firms – in the context of board monitoring (e.g. Fracassi and Tate, forthcoming, or Hwang and Kim, 2009) or even for the quality of M&A decisions (Cai and Sevilir, forthcoming). If well-connected CEOs are simply managers who have more ties to people – including their own board members, then our results may be the effect of bilateral ties rather than centrality per se. To address this possibility, we performed several robustness checks. First, we studied the incidence of CEO-board links for the subsamples of CEOs with high vs. low centrality where the existence of CEO-board links was measured by prior joint work experience in listed companies, board memberships, and common education experience. We found that the occurrence of CEO-board links was nearly identical between the two subsamples. That is – CEOs who are or are not well-connected have roughly the same chance to have ties to their own board members. This result implies that the higher likelihood of acquisitions combined with inferior bidder gains documented in Tables 4-8 is indeed primarily due to CEO centrality, and not CEO-board links. Second, we added the variable measuring the incidence of CEO-board links directly to our Probit models analyzing acquisition likelihood (Table 4) and Abnormal returns (Tables 5-8). Addition of this variable left the significances of Centrality coefficients, as well as coefficients for other variables nearly identical to those

presented in Tables 4-8.

5. The Mitigating Effect of Corporate Governance and Control on CEO Centrality

So far, our results regarding the link between bidder CEO centrality, the likelihood of acquisitions, and acquisition gains suggest that well-connected acquirer CEOs are associated with frequent value-destroying (especially for bidder shareholders) acquisitions.[38] In this section, we study whether strong internal governance at the bidder firms and efficient external markets for corporate control and executive labor market can mitigate the adverse effects of bidder CEO centrality.

5.1. *Internal Corporate Governance on Bidding Likelihood and Acquisition Gains*

Results in prior tables show that CEO centrality is generally negatively related to merger performance, in that higher network CEOs initiated more acquisitions, paid more premiums to target shareholders, and results in higher discount to their own firms. In this section, we turn to measures of internal corporate governance to study whether such negative outcome can be mitigated through better internal corporate governance.

Table 9 contains the results of multiple Probit models of acquisition frequencies. Each model contains all determinants (unrelated to centralities) utilized in Model 1 of Table 4. The corresponding regression coefficients are not reported in Table 9. Instead, for each model, we report the following three coefficients: (i) High_Centrality dummy (equal to one if the CEO

[38] Our results should not be interpreted to suggest that CEO personal social networks are always value destructive. It is possible that due to our sample formation – S&P 1500 CEOs have above-average centrality and the bidder CEOs among them have even higher centrality, on average (Table 3) – our results only reflect the impact of large (rather than smaller, potentially more optimal) personal networks. We repeated the regression analysis in Tables 4 and 6-8 where we replaced our measures of centrality by "excess centrality" – residuals from the regression of centrality on the selected determinants – size, growth opportunities (Tobin's Q), profitability, and optimism (measured following Malmendier and Tate, 2008). Our results – namely the higher likelihood of acquisitions and lower acquisition gains – were nearly identical utilizing "excess centrality" compared to the results with centrality variables presented in Tables 4 and 6-8.

centrality is above the sample median); (ii) "Strong Governance" dummy equal to one if the governance factor typically associated with stronger governance - i.e. Intense Monitoring, Small Board, Absence of CEO-Chairman Duality, Low E-index, CEO Age, Block Ownership, and CEO Ownership - is present (or, in case of continuous variables, higher than the sample median) at the bidder company (see Table 4 discussion for the definitions of governance dummies); (iii) High Centrality*Strong Governance. We expect the sum of those three coefficients (which together measure the joint impact of High Centrality of the Bidder CEO in the environment of strong bidder governance to be significantly smaller than the coefficient for High Centrality (which measures the effect of highly-central CEO operating in the bidder company with weak governance.

Table 9 results weakly support our expectations for three governance mechanisms – intense monitoring, CEO-Chairman separation (the opposite of duality), and (high) CEO Age – appear to mitigate the high acquisition tendencies of well-connected CEOs. The economic significance for the results are large. For example, having intensive monitoring boards reduces the likelihood for takeovers for high-centrality CEOs by -14.7%, -16.8%, -11.8%, -12.5% using Closeness, Degree, Betweenness, and Eigenvector centralities. The probability goes down by 2 to 6% if CEO is not the Chairman. However, we don't find evidence of CEO or other block owners affecting the likelihood of takeovers. In addition, we find that small boards increase takeover likelihood by more than 15% (the most conservative estimates) if CEO has high network centrality.

In summary, our results suggest that after controlling for the effect of strong governance on reducing the overall acquisition likelihood (as we documented in Table 4), board members serving as intensive monitors and having non-CEO Chairmen further reduce the influence of powerful CEOs in their acquisition frequencies.

Table 10 contains the analysis of the impact of interaction between High Centrality and Strong Governance on Acquirer Cumulative Abnormal Returns. The design is very similar to that presented in Table 9: we analyze series of regression models explaining bidder gains utilizing determinants from Model 1 in Table 6 (coefficients not reported) plus (i) High_Centrality; (ii) Strong Governance and (iii) High Centrality*Strong Governance. We expect that if strong governance mitigates the opportunistic behavior of more central CEOs, the sum of the coefficients measuring the joint effect of high centrality and strong governance should exceed the coefficient on High Centrality alone. Unfortunately, we only find one variable, Block Ownership of 5% or more, increases bidder CAR by about .50%. We do not see this result for any other of our considered governance factors. The results suggest that strong governance is unable to improve bidder returns on the activities of well-connected CEOs.

5.2.Bidder CEO Centrality and the Market for Corporate Control

In this and the next sections, we will examine whether our results suggesting the link between acquirer CEO centrality, acquisition likelihood, and acquisition gains may be due to CEO entrenchment. If well-connected CEOs have entrenchment power, we should observe that those CEOs can be immune from external (market for corporate control), as well as internal (board) monitoring.

Mitchell and Lehn (1990) provide evidence supporting the general disciplinary role of corporate takeovers. They show that acquirers that make value-destroying acquisitions measured by negative cumulative abnormal returns around merger announcement more likely end up as future takeover targets. More specifically, Mitchell and Lehn (1990) show that in the model predicting current bidders becoming future targets, the CAR to bidder shareholders becomes a significantly negative determinants of subsequent acquisition (i.e. positive CARs lower the

likelihood, negative CARs increase the subsequent acquisition chances). Hence, if more central CEOs are more likely to be entrenched (as we expect in Hypothesis H4) and are thus insulated from the market for corporate control, we should expect the bidder CAR to be a less positive determinant of the likelihood the bidder will be subsequently acquired.

To test whether more central acquirer CEOs are insulated from the market for corporate control, we follow Mitchell and Lehn's (1990) methodology and use a subsample of acquisitions announced from January 1st 2000 until December 31st 2005 so that we can have a 5 year window following the acquisition announcement to witness if the firm ended subsequently acquired. Moreover, we follow their restriction in limiting the sample to include acquirers that acquire targets with at least 5% of acquirer's market value (i.e. to analyze acquisitions that were "material" for the bidder). Finally, if the acquirer has more than one acquisition, we use the sum of the abnormal cumulative returns associated with those deals. This led the models to include 222 observations. To test the likelihood that an acquirer becomes subsequently an acquired target, we run the following Probit model:

$$P(\text{Targeted}=1) = a_t + B_1\text{Centrality} + B_2\text{CAR} + B_3\text{Centrality*CAR} + B_4\text{Size} + B_5\text{Profitability} + B_6\text{Tobin'sQ} + B_7\text{Leverage} + B_8\text{Relative\_Target\_Size} + e_t \quad (4)$$

where the dependent variable is a dummy variable that equals one if the acquirer was successfully acquired within five years of its first acquisition and zero otherwise, Centrality is the CEO centrality as defined previously, CAR is the acquirer shareholder cumulative abnormal returns computed at the (-3, +3) event window around the merger announcement, Centrality*CAR is an interaction term between Centrality and CAR. All other variables are as previously defined. All independent and control variables are calculated at the end of year 1999.

The results of our analysis are presented in Table 11. Centrality is measured using Closeness

in model 1, Degree in model 2, Betweenness in model 3, and Eigenvector in model 4. Consistent with Mitchell and Lehn (1990), CARs are significantly negative (3 out of the 4 models). Bad bidders indeed have higher probability in becoming good targets. Most importantly, the interaction between Centrality and CAR is positive and statistically significant in all four models. The size of the interactive coefficient Centrality*CAR out-balances the negative coefficient on CAR, which implies that the likelihood of being acquired is unaffected by the bidder CAR for companies ran by well-connected CEO. Consequently, our findings support Hypothesis H3 that well-connected bidder CEOs are insulated from external monitoring by the market for corporate control.

5.3.Bidder CEO Centrality and the Managerial Labor Market

The executive labor market is an important dimension of corporate governance. It disciplines managers and forces them not to deviate from value enhancing policies. Well-governed firms optimally fire poorly performing CEOs. Warner et al. (1988) and Weisbach (1988) find that the likelihood of a top executive turnover is negatively associated with the firm's stock returns. The forced turnover is a serious threat for a CEO, because his/her reputation, future employment opportunities and lifetime income stream are significantly adversely affected (Jensen and Murphy, 1990). However, for centrally positioned CEOs, the threat of forced turnover may not be effective, if they are able to utilize their influence and power gained from their personal networks to get insulated from the managerial labor market.

To determine whether more central acquirer CEOs who perform value-destroying acquisitions are insulated from the managerial labor market and can protect themselves from getting fired, we follow Lehn and Zhao (2006) in modeling the probability of a disciplinary CEO turnover in a five year window following the first merger announcement by the firm's CEO

during the sample period. Lehn and Zhao (2006) show that in the model predicting CEO disciplinary (i.e. forced) turnover, the bidder CAR is a significantly negative determinant. Thus, CEOs responsible for poorly-performing acquisitions are more likely to get replaced.

We perform our analysis on a subsample of acquisitions that are announced from January 1st 2000 to December 31st 2005 to observe whether the CEO is replaced after 5 years from the date of the first merger announcement. In addition, following Lehn and Zhao (2006), if there is more than one acquisition in the sample, we only keep the first acquisition if all acquisitions are conducted by the same CEO. If they are conducted by different CEOs, then we keep the first acquisition for each different CEO. Finally, we restrict the sample to include only acquisitions where the target constitutes at least 10% of the acquirer's market value (in order to focus on mergers that are "material" for the bidder following Lehn and Zhao 2006). Our final sample includes 173 CEOs.

To get data about CEO turnovers, we download the CEOs data from EXECUCOMP and use the annual CEO flag (CEOANN) to identify the firm's CEO right before the first merger announcement during the sample period and compare his/her name and ID number (EXECID) to the firm's CEO after 5 years. If they are not the same then we have to decide whether the CEO's replacement is due to a disciplinary turnover. We follow Lehn and Zhao's (2006) definition for disciplinary turnover. Disciplinary turnovers are when CEOs are replaced by internal governance, takeovers, or bankruptcy. We investigate the variable (REASON) in EXECUCOMP to check the reason behind the CEO's replacement. If the reason is missing or unknown we use age as a proxy for disciplinary turnovers. If the age of the CEO is less than 65 when replaced then we consider it a disciplinary turnover. If the firm is acquired or bankrupt during the 5 year window, we check to see if the CEO retains a position in the post merged entity, if not then we

identify the turnover also as a disciplinary turnover. We estimate the following Probit model:[39]

$$P(CEO\_Turnover=1) = a_t + B_1 High\_Centrality + B_2 CAR + B_3 High\_Centrality * CAR + B_4 Pre\text{-}ROA(3) + B_5 Post\_ROA(3) + B_6 Age + B_7 Tenure + B_8 Stock\_Deal + B_9 Relative\_Target\_Size + B_{10} Firm\_Got\_Acquired + e_t \quad (5)$$

where the dependent variable is a dummy variable that equals 1 if there is a disciplinary CEO turnover within a five year window of the first merger announcement and zero otherwise, High_Centrality is a dummy variable that equals 1 if the CEO centrality is above sample the median and zero otherwise, CAR is the acquirer shareholder cumulative abnormal returns computed at the (-3, +3) event window around the merger announcement, High_Centrality*CAR is an interaction term between High_Centrality and CAR, Pre_ROA(3) is the average of 3 year firm's return on assets prior to the merger announcement, Post_ROA(3) is the average of 3 year firm's return on assets after the merger announcement, Age is the age of the CEO, Tenure is the tenure of the CEO, Stock_Deal is a dummy that equals 1 if the deal is entirely financed by stock and zero otherwise, Relative_Target_Size is the market value of the target divided by the market value of the acquirer before the first merger announcement, and Firm_Got_Acquired is a dummy that equals 1 if the firm got acquired within a 5 year window and zero otherwise.

The results for this model are presented in Table 12. In models 1, 2, 3, and 4, we add in the High_Centrality to Lehn and Zhao's (2006) model and an interaction term between High_Centrality and CARs to show the incremental effect of centrality on disciplinary CEO replacements. Lehn and Zhao (2006) show that CARs are significantly negatively related to disciplinary turnovers, i.e. bad bidders end up fired , but if more central CEOs are insulated from

[39] Alternatively, we repeated the Probit model using Centrality as a continuous variable and the results are qualitatively similar but less significant.

the managerial labor market , then High_Centrality *CAR should be positive.

Our results show that the interactive coefficient High_Centrality *CAR indeed is positive in all models, and significant in three out of four considered centrality specifications. For all of our models the interactive coefficient reverses the negative coefficient on CAR. Thus, while for the less central bidder CEOs, the poor acquisition performance (resulting in a negative CAR) increases the likelihood of forced turnover (consistent with Lehn and Zhao, 2006), the likelihood of forced turnover for well-connected CEOs is unaffected by their previous merger performance. This result is consistent with Hypothesis H4 – well-connected CEOs are less likely to be fired "for a cause" (that is, because of creating a value-destructive merger deal). Consequently, well-connected CEOs appear to be less affected by managerial labor markets.

Equally importantly, the coefficient on High_Centrality is positive and significant in all models. That is, well-connected bidder CEOs are replaced more likely regardless of company's performance. This is consistent with Liu (2010) who finds (for the sample of CEOs not involved in M&A activities) that more central CEOs have higher likelihood of departure due to their valuable personal social networks that help them find alternative outside job opportunities. We now turn our attention to the analysis of new jobs acquired by replaced bidder CEOs to see whether similar supportive personal social networks play the role for CEOs involved in M&As as well.

Our results are presented in Table 13. We found the new job positions and titles for previously fired bidder CEOs in our sample utilizing Lexis Nexis database, as well as Internet searches. Our final sample contains 67 CEOs. Anytime a fired CEO is able to find a new position that carries a CEO or a Chairman title (including combinations such as CEO&Chairman or CEO&President), we classify this change as a "lateral shift." Any other change to a new position

– which includes titles of President, other Executives, Directors, as well as no reported job – are classified as "demotions." Panel A shows that there is a total of 21 (32%) of CEOs "lateral shifts" in our sample. Panel B documents that similarly to Liu (2010), well-connected bidder CEOs have a greater chance of the "lateral shift" (on average by more than 11%) Overall, the findings in Table 13 provide support for Hypothesis H4B. Even though more central CEOs are replaced more often, they have relatively richer opportunities to find a reputable, well-paid job after their dismissal. Consequently, they are less likely to be disciplined by the threat of dismissal.

6. Conclusion

Utilizing BoardEx database, we construct four measures of network centrality for CEOs from S&P 1500 companies: Closeness, Degree, Betweenness, and Eigenvector. Greater CEO centrality may help or hurt bidding companies during the acquisition process. On the one hand, well-connected CEOs can benefit from better access to information. On the other hand, central network position may allow CEOs to utilize their increasing influence and power to entrench themselves and withstand both external (market for corporate control) and internal (managerial labor market) monitoring. Our results suggest the latter effect to be the more prevalent.

We find that greater bidder CEO centrality is associated with greater likelihood of completing acquisitions, but also with greater losses to bidder shareholders, and declining (and ultimately negative) levels of total takeover synergies. Further supporting the connection between high centrality and managerial entrenchment, we also find that bidding companies ran by well-connected CEOs are less likely (compared to acquirers with less-central CEOs) to be taken over following a value-destroying acquisition. In addition, more central bidder CEOs are less likely to be dismissed due to previous acquisition generating shareholder losses, and, even if

they are terminated, those CEOs are more likely to find another CEO-equivalent job. Our results are robust to various alternative model specifications, and they do not appear to be driven by potential CEO overconfidence.

Overall, we contend that our results provide an important intermediate step, which connects the two major findings of previous finance research – the concept of "social connections" between any two people and the concept of eventual value losses and poor monitoring due to the existence of such network ties. Our findings suggest that well-connected CEOs may become powerful enough to be able to pursue any corporate activities, regardless of their potentially negative impact on shareholders.

Appendix: CEO Centrality Measures

Table A-1 presents summary statistics on the four measures of CEO centrality for the S&P 1500 CEOs in the sample in Panel A and on the percentile rankings of those CEOs based on their position in the network of all executives and directors of US public companies in Panel B. This table shows how different measures of centrality represent different aspects of social-connectedness. By looking at degree, we can simply know the number of relations a CEO has within this large network of all executives and directors. The minimum number of relations is 2. However , the minimum Betweenness and Eigenvector centrality measures is zero , which suggests that there are some CEOs who have general relations with other executives and directors but those relations do not control the flow of information between other CEOs or are relations not associated with other important CEOs in the network. By looking at percentile rankings, the mean (median) of the S&P 1500 CEO centrality lies in the 67.9 (73^{th}), 71.62^{th} (78^{th}) , 76.06^{th} (84^{th}) and 73.83^{th} (78^{th}) percentile rank of the network of all executives and directors when using Closeness , Degree , Betweenness, and Eigenvector as measures of centrality, respectively. Overall, this suggests that the S&P1500 CEOs are central compared to the other directors and executives of US public companies.

Table A2 classifies the S&P 1500 firms in the sample into Fama and French 12 industry classifications. we present the full sample first in Panel A. The largest industry group is Business Equipment which represents 18.68% of the sample. It doesn't seem that there is any certain industry clustering in the sample. Then, we break the sample up into Below Median versus Above Median sub-groups in Panels B-E based on the CEO's centrality. Below Median is when the CEO centrality is below sample median. Above Median is when the CEO centrality is above sample median.

Appendix

Table A-1: Summary Statistics for Centrality Measures

This table presents summary statistics on the four centrality measures for the CEOs in the sample. The sample covers S&P 1500 CEOs in the period spanning from January 1st 1999 to December 31st 2008. Centrality measures are as defined in section 2.1. The statistics are presented for the centrality measures in panel A and for the percentile ranks for the sample of CEOs based on the social network of all directors and executives of US public companies in panel B.

	N	Mean	Median	Std.	Min.	Max.
Panel A : Using Centrality Measures						
Closeness	16415	0.364	0.361	0.049	0.197	1
Degree	16415	153.85	76	205.870	2	1985
Betweenness	16415	0.0001	0.000	0.0001	0	0.0037
Eigenvector	16415	176.27	2.581	1162.986	0	14085.49
Panel B : Using Percentiles						
Closeness	16415	67.895th	73th	21.732	1st	100th
Degree	16415	71.620th	78th	24.235	2nd	100th
Betweenness	16415	76.063th	84th	24.495	1st	100th
Eigenvector	16415	73.826th	78th	21.258	1st	100th

Table A-2 : Classification by Industry

This table classifies the sample of S&P 1500 firms by industry. Industry classifications are based on Fama and French 12 industry classifications. The full sample is presented first in panel A and then broken up into Below Median vs. Above Median sub-groups in panels B-E based on the centrality of the firm's CEO. Below Median is when the CEO centrality is below the sample median. Above Median is when the CEO centrality is above sample median. Panels B, C, D, and E present the numbers when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality, respectively.

	Panel A	Panel B :Closeness				Panel C: Degree				Panel D :Betweenness				Panel E : Eigenvector			
	Full Sample	Below Median		Above Median		Below Median		Above Median		Below Median		Above Median		Below Median		Above Median	
Industry	N	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Consumer Non-Durables	989	481	49%	508	51%	511	52%	478	48%	541	55%	448	45%	539	54%	450	46%
Consumer Durables	434	211	49%	223	51%	225	52%	209	48%	192	44%	242	56%	197	45%	237	55%
Manufacturing	2,022	932	46%	1,090	54%	915	45%	1,107	55%	912	45%	1,110	55%	1,012	50%	1,010	50%
Oil, Gas and Coal	650	396	61%	254	39%	367	56%	283	44%	312	48%	338	52%	457	70%	193	30%
Chemical Products	505	134	27%	371	73%	149	30%	356	70%	185	37%	320	63%	196	39%	309	61%
Business Equipment	3,067	1,261	41%	1,806	59%	1,330	43%	1,737	57%	1,512	49%	1,555	51%	866	28%	2,201	72%
Telephone and Television	348	159	46%	189	54%	165	47%	183	53%	154	44%	194	56%	167	48%	181	52%
Utilities	841	458	54%	383	46%	400	48%	441	52%	408	49%	433	51%	488	58%	353	42%
Wholesale and Retail	1,934	1,119	58%	815	42%	1,117	58%	817	42%	1,116	58%	818	42%	1,171	61%	763	39%
Healthcare	1,285	627	49%	658	51%	606	47%	679	53%	597	46%	688	54%	685	53%	600	47%
Finance	2,403	1,546	64%	857	36%	1,456	61%	947	39%	1,483	62%	920	38%	1,575	66%	828	34%
Other	1,937	1,054	54%	883	46%	1,078	56%	859	44%	1,025	53%	912	47%	1,084	56%	853	44%
Total	16,415	8,378	51%	8,037	49%	8,319	51%	8,096	49%	8,437	51%	7,978	49%	8,437	51%	7,978	49%

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Table 1 Summary Statistics for Firms' Financials

This table presents the summary statistics for the S&P 1500 firms and the bidder sample covered in the paper, in Panel A and B, respectively. The statistics are presented for the full sample first and then classified into Below vs. Above median. Below Median is when the CEO centrality is below the sample median. Above Median is when the CEO centrality is above sample median. Each subpanel contains the statistics when using Closeness, Degree, Betweenness, and Eigenvector as measures of centrality, respectively. Size is measured as the log of total assets. Tobin's Q is measured as the sum of market value of equity (end of year price per share * number of shares outstanding at the end of year), short term debt, long term debt, and preferred stock divided by total value of assets. Profitability is measured as the return on total assets. Leverage is measured as the ratio of book value of debt to total assets. Liquidity is measured as the ratio of operating cash flow to total assets. * **, ** Denotes statistically significant difference between means of Below and Above centrality groups at the 1% and 5% levels, respectively.

Panel A: S&P 1500 Sample

A1: Using Closeness Centrality

	Full Sample			Below Median		Above Median		Difference
	N	Mean	Median	Mean	Median	Mean	Median	Below-Above
Size	16415	7.607	7.469	7.085	6.954	8.151	8.050	-1.066***
Tobin's Q	16415	1.667	1.168	1.609	1.153	1.727	1.184	-0.117***
Profitability	16415	0.034	0.041	0.037	0.041	0.030	0.041	0.007***
Leverage	16415	0.229	0.211	0.220	0.193	0.239	0.227	-0.019***
Liquidity	16415	0.090	0.086	0.090	0.085	0.090	0.088	-0.001
A2: Using Degree Centrality								
Size	16415	7.607	7.469	7.025	6.893	8.205	8.122	-1.180***
Tobin's Q	16415	1.667	1.168	1.634	1.171	1.700	1.167	-0.066**
Profitability	16415	0.034	0.041	0.037	0.042	0.030	0.041	0.007***
Leverage	16415	0.229	0.211	0.217	0.193	0.242	0.228	-0.025***
Liquidity	16415	0.090	0.086	0.091	0.086	0.089	0.087	0.001
A3: Using Betweenness Centrality								
Size	16415	7.607	7.469	7.215	7.040	8.021	7.920	-0.806***
Tobin's Q	16415	1.667	1.168	1.680	1.178	1.653	1.158	0.027
Profitability	16415	0.034	0.041	0.036	0.042	0.031	0.041	0.005***
Leverage	16415	0.229	0.211	0.216	0.190	0.243	0.231	-0.027***
Liquidity	16415	0.090	0.086	0.090	0.085	0.090	0.087	-0.000
A4: Using Eigenvector Centrality								
Size	16415	7.607	7.469	7.267	7.133	7.966	7.863	-0.700***
Tobin's Q	16415	1.667	1.168	1.549	1.128	1.791	1.223	-0.242***
Profitability	16415	0.034	0.041	0.039	0.042	0.029	0.041	0.010***
Leverage	16415	0.229	0.211	0.231	0.209	0.227	0.214	0.003
Liquidity	16415	0.090	0.086	0.090	0.084	0.090	0.088	0.001

Panel B : Bidder Sample

B1: Using Closeness Centrality

		Full Sample		Below Median		Above Median		Difference Below-Above
	N	Mean	Median	Mean	Median	Mean	Median	
Size	776	8.754	8.686	8.138	8.013	9.01	9.088	-0.872***
Tobin's Q	776	1.935	1.348	1.412	0.985	2.152	1.495	-0.741***
Profitability	776	0.052	0.05	0.043	0.028	0.055	0.057	-0.013*
Leverage	776	0.201	0.189	0.228	0.232	0.19	0.178	0.038***
Liquidity	776	0.101	0.096	0.081	0.058	0.109	0.113	-0.028***
A2: Using Degree Centrality								
Size	776	8.754	8.686	7.797	7.722	9.129	9.253	1.332***
Tobin's Q	776	1.935	1.348	1.622	1.097	2.058	1.449	-0.436**
Profitability	776	0.052	0.05	0.04	0.032	0.056	0.055	-0.016**
Leverage	776	0.201	0.189	0.232	0.238	0.189	0.179	0.043***
Liquidity	776	0.101	0.096	0.085	0.067	0.107	0.108	-0.022***
A3: Using Betweenness Centrality								
Size	776	8.754	8.686	8.346	8.325	8.99	8.987	-0.644***
Tobin's Q	776	1.935	1.348	1.808	1.133	2.009	1.456	-0.201
Profitability	776	0.052	0.05	0.049	0.035	0.053	0.056	-0.004
Leverage	776	0.201	0.189	0.215	0.205	0.193	0.182	0.022*
Liquidity	776	0.101	0.096	0.088	0.074	0.108	0.11	-0.020***
A4: Using Eigenvector Centrality								
Size	776	8.754	8.686	8.426	8.398	8.901	8.973	-0.475***
Tobin's Q	776	1.935	1.348	1.409	1.024	2.171	1.559	-0.762***
Profitability	776	0.052	0.05	0.045	0.031	0.055	0.057	-0.009
Leverage	776	0.201	0.189	0.238	0.233	0.184	0.175	0.054***
Liquidity	776	0.101	0.096	0.084	0.065	0.108	0.109	-0.024***

Table 2: Number of Acquisitions Classified by Year of Merger Announcement

This table presents the number of acquisitions in the sample classified by year of merger announcement. Date of merger announcement is the original date of announcement as reported by SDC. The acquirers are members of S&P 1500 and the targets are U.S. public companies. All acquisitions are successfully completed acquisitions. Panel A presents the number of acquisitions for the full sample. Panels B-E divides the number of acquisitions into two groups based on the centrality of the acquirer's CEO. Below Median is when the CEO centrality is below sample median. Above Median is when the CEO centrality is above sample median. Panels B, C, D, and E presents the number of acquisitions when using Closeness, Degree, Betweenness, and Eigenvector as measures of CEO centrality, respectively.

Panel A		**Panel B : Closeness**				**Panel C : Degree**				**Panel D : Betweenness**				**Panel E : Eigenvector**			
Full Sample		**Below Median**		**Above Median**		**Below Median**		**Above Median**		**Below Median**		**Above Median**		**Below Median**		**Above Median**	
Year	N	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2000	114	28	25%	86	75%	31	27%	83	73%	43	38%	71	62%	31	27%	83	73%
2001	108	25	23%	83	77%	25	23%	83	77%	36	33%	72	67%	30	28%	78	72%
2002	62	22	35%	40	65%	20	32%	42	68%	21	34%	41	66%	22	35%	40	65%
2003	69	23	33%	46	67%	23	33%	46	67%	28	41%	41	59%	25	36%	44	64%
2004	77	27	35%	50	65%	22	31%	55	71%	25	32%	52	68%	29	38%	48	62%
2005	79	21	27%	58	73%	18	23%	61	77%	29	37%	50	63%	27	34%	52	66%
2006	82	26	32%	56	68%	24	29%	58	71%	31	38%	51	62%	22	27%	60	73%
2007	78	21	27%	57	73%	21	27%	57	73%	25	32%	53	68%	23	29%	55	71%
2008	50	12	24%	38	76%	12	24%	38	76%	19	38%	31	62%	10	20%	40	80%
2009	57	15	26%	42	74%	16	28%	41	72%	15	26%	42	74%	13	23%	44	77%
Total	776	220	28%	556	72%	212	27%	564	73%	272	35%	504	65%	232	30%	544	70%

Table 3: Difference in CEO Centrality between Acquirers and Non-Acquirers

This table presents the univariate tests for difference between centrality of acquirer CEOs versus non-acquirer CEOs. Acquirers are members of S&P 1500 firms that successfully completed acquisitions of public US targets. The results of the tests are presented using centrality measures in panel A and using centrality percentiles in panel B. *** Denotes statistical significance at the 1% level.

Panel A : Using Centrality Measures

	Full sample				Acquirers				Non-Acquirers				T Test	Wilcoxn Test
Centrality	**N**	**Mean**	**Median**	**Std.**	**N**	**Mean**	**Median**	**Std.**	**N**	**Mean**	**Median**	**Std.**	**T-Value**	**Z- Value**
Closeness	16415	0.364	0.361	0.049	776	0.386	0.387	0.047	15639	0.363	0.360	0.049	-12.86***	-13.16***
Degree	16415	153.85	76	153.85	776	266.99	151	288.38	15639	148.74	75	199.85	-10.81***	-14.58***
Betweenness	16415	0.0001	0.0000	0.0001	776	0.0001	0.0001	0.0002	15639	0.0001	0.0000	0.0001	-7.73***	-11.99***
Eigenvector	16415	176.269	2.581	1163.0	776	436.088	17.644	1862.092	15639	164.523	2.285	1119.8	-3.86***	-12.48***

Panel B: Using Centrality Percentiles

Closeness	16415	73.00	67.90	21.73	776	75.69	82.00	19.89	15639	67.54	73.00	21.75	-10.63***	-11.11***
Degree	16415	71.62	78.00	24.23	776	83.66	91.00	18.42	15639	71.08	78.00	24.33	-17.52***	-15.03***
Betweenness	16415	76.06	84.00	24.50	776	84.10	91.00	21.00	15639	75.70	84.00	24.58	-10.34	-11.97***
Eigenvector	16415	73.83	78.00	21.26	776	82.61	89.00	18.98	15639	73.43	78.00	21.27	-12.54***	-13.17***

Table 4: Probit Model of Acquisitions

This table presents the results of Probit estimation based on the entire sample of S&P 1500 firms from the period spanning January 1st 2000-December 31st 2009. The dependent variable is the probability that the firm announced a successfully completed acquisition of a US public target. Centrality is the CEO's centrality measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8, and Eigenvector in models 5 and 9. Intense_Monitoring is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise, Board_Size is the size of the board of directors, Duality is a dummy variable that equals one if the CEO is also the chairman of the board and zero otherwise, Eindex is Bebchuk, Cohen and Ferrell's (2009) entrenchment index, age is the CEO's age, Block_Ownership is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise, CEO_Ownership is the percentage of shares owned by the CEO , and all other variables are as previously defined. All independent variables and controls are lagged one year. P-values are in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Centrality		0.3156***	0.6755***	0.4168***	0.6162***	0.2073*	0.5920***	0.3723***	0.5004***
		(0.001)	(0.000)	(0.000)	(0.000)	(0.056)	(0.000)	(0.000)	(0.000)
Tobin's Q	0.0385***	0.0362***	0.0326***	0.0361***	0.0323***	0.0338***	0.0300***	0.0330***	0.0305***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Liquidity	0.3903	0.2654	0.1504	0.2648	0.1900	0.3581	0.2201	0.3281	0.2710
	(0.164)	(0.348)	(0.596)	(0.348)	(0.502)	(0.261)	(0.491)	(0.302)	(0.395)
Profitability	0.2698	0.3513	0.4491*	0.3472	0.4523*	0.4232	0.5111	0.4420	0.5028
	(0.312)	(0.190)	(0.096)	(0.196)	(0.092)	(0.173)	(0.102)	(0.156)	(0.106)
Size	0.2147***	0.2000***	0.1775***	0.1999***	0.1929***	0.1840***	0.1636***	0.1815***	0.1760***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.7684***	-0.7653***	-0.7635***	-0.7844***	-0.7360***	-0.8187***	-0.8155***	-0.8304***	-0.7957***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Intense_Monitoring						-0.1956***	-0.1902***	-0.1979***	-0.1883***
						(0.000)	(0.000)	(0.000)	(0.000)
Board_Size						0.0106	0.0102	0.0105	0.0120
						(0.237)	(0.258)	(0.240)	(0.181)

Table 4 : Probit Model of Acquisitions

(contd.)

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Duality						0.0887**	0.0756*	0.0798*	0.0830*
						(0.043)	(0.087)	(0.070)	(0.059)
Eindex						-0.0126	-0.0122	-0.0119	-0.0094
						(0.400)	(0.418)	(0.429)	(0.535)
Age						-0.0122***	-0.0121***	-0.0128***	-0.0115***
						(0.000)	(0.000)	(0.000)	(0.000)
Block_Ownership						0.0328	0.0432	0.0376	0.0397
						(0.561)	(0.446)	(0.506)	(0.482)
CEO_Ownership						-1.0826**	-0.8714*	-1.0550**	-0.9596*
						(0.036)	(0.091)	(0.042)	(0.063)
Constant	-3.3949***	-3.4891***	-3.5908***	-3.5908***	-3.6820***	-2.6182***	-2.7513***	-2.7060***	-2.8540***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	16,415	16,415	16,415	16,415	16,415	13,398	13,398	13,398	13,398
Pseudo R^2	7.49%	7.68%	8.33%	7.87%	8.16%	8.42%	8.93%	8.62%	8.75%

****, **, * Denotes statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 5: Cumulative Abnormal Returns Around Merger Announcement

This table presents the cumulative abnormal returns around the merger announcement over the three day event window (-3, +3) for the acquirer, the combined firm, and the target in panels A, B and C, respectively. In each panel, numbers are presented first for the full sample and then divided into three groups based on the centrality of the acquirer's CEO. Group 1 is when the acquirer's CEO centrality is below the 25th percentile of the sample, Group2 is when the acquirer's CEO centrality is between 25th and 75th percentile of the sample, and Group3 is when CEO Centrality is above the 75th percentile of the sample. In each panel, the four measures of centrality, Closeness, Degree, Betweenness, and Eigenvector are used to classify the sample into those groups of centrality. The CAR for the combined firm is calculated as the market value weighted average of CAR for the acquirer and CAR for the target. *** . **, * Denotes statistically different from zero at the 1%, 5%, and 10% levels, respectively. (a), (b),(c) denotes that the difference between Group1 and Group3 is statistically significant at the 1%, 5%, and 10% levels, respectively.

Panel A: Acquirer CARs

	Full Sample			Group1			Group2			Group3			1-3
CAR (-3,+3)	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median	Diff
Closeness	776	-1.87%***	-1.41%***	202	-0.69%	-0.84%	405	-2.23%***	-1.77%***	169	-2.39%***	-1.25%***	1.7%**(b)**
Degree	776	-1.87%***	-1.41%***	206	-0.51%	-1.17%	410	-2.26%***	-1.42%***	160	-2.61%***	-1.47%***	2.1%**(b)**
Betweenness	776	-1.87%***	-1.41%***	206	-1.29%***	-1.12%**	411	-2.04%***	-1.77%***	159	-2.17%***	-1.26%***	0.9%
Eigenvector	776	-1.87%***	-1.41%***	207	-0.48%	-0.32%	403	-2.33%***	-1.86%***	166	-2.48%***	-1.41%***	2.0%**(b)**
Panel B: Combined CARs													
Closeness	776	0.68%**	0.33%**	202	2.25%***	1.61%***	405	0.39%	0.07%	169	-0.50%	-0.20%	2.8%**(a)**
Degree	776	0.68%**	0.33%**	206	2.68%***	1.61%***	410	0.27%	0.20%	160	-0.82%*	-0.48%	3.5%**(a)**
Betweenness	776	0.68%**	0.33%**	206	1.68%***	1.22%***	411	0.62%	0.23%	159	-0.45%	-0.20%	2.1%**(a)**
Eigenvector	776	0.68%**	0.33%**	207	2.11%***	1.64%***	403	0.38%	0.18%	166	-0.35%	-0.30%	2.5%**(a)**
Panel C : Target CARs													
Closeness	776	27.39%***	21.28%***	202	22.20%***	19.28%***	405	28.59%***	22.09%***	169	30.74%***	23.69%***	-8.5%**(a)**
Degree	776	27.39%***	21.28%***	206	23.59%***	19.71%***	410	28.59%***	22.58%***	160	29.22%***	23.27%***	-5.6%**(c)**
Betweenness	776	27.39%***	21.28%***	206	23.22%***	19.90%***	411	28.16%***	21.35%***	159	30.81%***	24.07%***	-7.6%**(b)**
Eigenvector	776	27.39%***	21.28%***	207	21.57%***	19.00%***	403	29.49%***	22.68%***	166	29.57%***	21.86%***	-8.0%**(a)**

Table 6 : Effect of Acquirer's CEO centrality on Acquirer Cumulative Abnormal Returns

This table presents the estimates of OLS regression for acquirer cumulative abnormal returns on measures of centrality for acquirer CEO and other control variables. The dependent variable is the acquirer CAR over the three day window surrounding the merger announcement. Centrality of acquirer CEO is measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8, and Eigenvector in models 5 and 9. Deal Value is the deal value as reported by SDC divided by the market value of the acquirer. Same_Industry is a dummy variable that equals one if the acquirer and target have the same 2 digit SIC code and zero otherwise. Stock_Deal is a dummy variable that equals one if the transaction is financed entirely by stock and zero otherwise. All other variables are as previously defined. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P-values are in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
		Closeness	**Degree**	**Betweenness**	**Eigenvector**	**Closeness**	**Degree**	**Betweenness**	**Eigenvector**
Centrality		-0.0763***	-0.0682***	-0.0458***	-0.0798***	-0.0816***	-0.0771***	-0.0548***	-0.0857***
		(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Size	-0.0006	0.0034	0.0036	0.0014	0.0029	0.0030	0.0030	0.0008	0.0023
	(0.779)	(0.131)	(0.130)	(0.534)	(0.189)	(0.284)	(0.292)	(0.764)	(0.408)
Profitability	0.1629***	0.1484***	0.1499***	0.1567***	0.1494***	0.1439***	0.1440***	0.1502***	0.1445***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.006)	(0.006)	(0.004)	(0.006)
Tobin's Q	-0.0031**	-0.0027*	-0.0029*	-0.0033**	-0.0025*	-0.0035**	-0.0036**	-0.0042***	-0.0033**
	(0.038)	(0.072)	(0.051)	(0.027)	(0.097)	(0.020)	(0.019)	(0.006)	(0.029)
Leverage	0.0679***	0.0628***	0.0585***	0.0646***	0.0620***	0.0656***	0.0621***	0.0687***	0.0649***
	(0.002)	(0.003)	(0.007)	(0.003)	(0.004)	(0.004)	(0.006)	(0.003)	(0.004)
Liquidity	0.0326	0.0504	0.0477	0.0430	0.0471	0.0185	0.0187	0.0145	0.0155
	(0.523)	(0.319)	(0.348)	(0.398)	(0.351)	(0.723)	(0.721)	(0.782)	(0.766)
Deal_Value	-0.0328***	-0.0343***	-0.0345***	-0.0356***	-0.0339***	-0.0398***	-0.0392***	-0.0412***	-0.0391***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Same_Industry	0.0034	-0.0004	0.0013	0.0029	-0.0001	-0.0009	0.0007	0.0024	-0.0010
	(0.598)	(0.950)	(0.844)	(0.649)	(0.982)	(0.888)	(0.911)	(0.714)	(0.881)

Table 6 : Effect of Acquirer's CEO centrality on Acquirer Cumulative Abnormal Returns (contd.)

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Closeness	Degree	Betweenness	Eigenvector	Closeness	Degree	Betweenness	Eigenvector
Stock_Deal	-0.0174**	-0.0194***	-0.0173**	-0.0170**	-0.0182**	-0.0141*	-0.0123	-0.0120	-0.0132*
	(0.018)	(0.008)	(0.018)	(0.021)	(0.012)	(0.060)	(0.101)	(0.110)	(0.077)
Intense_Monitoring						-0.0058	-0.0044	-0.0043	-0.0058
						(0.425)	(0.548)	(0.561)	(0.420)
Board_Size						0.0004	0.0009	0.0007	0.0005
						(0.772)	(0.479)	(0.562)	(0.676)
Duality						0.0077	0.0083	0.0078	0.0077
						(0.252)	(0.221)	(0.249)	(0.254)
Eindex						0.0016	0.0023	0.0023	0.0015
						(0.518)	(0.359)	(0.349)	(0.537)
Age						0.0001	0.0001	0.0002	0.0001
						(0.822)	(0.827)	(0.682)	(0.854)
Block_Ownership						0.0149*	0.0148*	0.0160*	0.0144
						(0.095)	(0.099)	(0.074)	(0.105)
CEO_Ownership						-0.1770**	-0.1799**	-0.1588**	-0.1698**
						(0.027)	(0.025)	(0.048)	(0.033)
Constant	-0.0480*	-0.0194	-0.0265	-0.0244	-0.0101	-0.0398	-0.0496	-0.0528	-0.0287
	(0.061)	(0.459)	(0.309)	(0.360)	(0.705)	(0.321)	(0.216)	(0.188)	(0.480)
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	776	776	776	776	776	685	685	685	685
Adjusted R^2	7.38%	9.52%	8.79%	8.35%	9.50%	10.48%	9.71%	9.31%	10.50%

Table 7 : Effect of Acquirer's CEO Centrality on Combined Cumulative Abnormal Returns

This table presents the estimates of OLS regression for combined cumulative abnormal returns on measures of centrality for acquirer CEO and other control variables. The dependent variable is the combined CAR over the three day window surrounding the merger announcement calculated as the weighted market value of acquirer CAR and target CAR. Centrality of acquirer CEO is measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8, and Eigenvector in models 5 and 9. Combined_Size is the total number of employees of both target and acquirer, Combined_Profitability is the asset weighted average of acquirer and target return on assets, Combined_Tobin's Q is the asset weighted average of the acquirer and target Tobin's Q, Combined_Leverage is the asset weighted average of acquirer and target debt to assets ratio, and Combined _Liquidity is the asset weighted average of ratio of operating cash flow to assets of acquirer and target. Deal Value is the deal value as reported by SDC divided by the market value of the combined entity. Same_Industry is a dummy variable that equals one if the acquirer and target have the same 2 digit SIC code and zero otherwise. Stock_Deal is a dummy variable that equals one if the transaction is financed entirely by stock and zero otherwise. All other variables are as previously defined. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P-values are in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
		Closeness	**Degree**	**Betweenness**	**Eigenvector**	**Closeness**	**Degree**	**Betweenness**	**Eigenvector**
Centrality		-0.0696***	-0.0641***	-0.0400***	-0.0696***	-0.0690***	-0.0667***	-0.0444***	-0.0707***
		(0.000)	(0.000)	(0.007)	(0.000)	(0.000)	(0.001)	(0.006)	(0.000)
Combined_Size	-0.0013	0.0022	0.0019	0.0002	0.0017	0.0012	0.0008	-0.0006	0.0007
	(0.508)	(0.312)	(0.383)	(0.908)	(0.411)	(0.654)	(0.774)	(0.822)	(0.792)
Combined_Profitability	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	(0.474)	(0.414)	(0.436)	(0.396)	(0.375)	(0.295)	(0.311)	(0.292)	(0.283)
Combined_Tobin's Q	-0.0028*	-0.0022	-0.0025	-0.0029*	-0.0020	-0.0034**	-0.0034**	-0.0041**	-0.0032*
	(0.072)	(0.162)	(0.107)	(0.061)	(0.194)	(0.045)	(0.041)	(0.016)	(0.055)
Combined_Leverage	0.0502**	0.0456**	0.0420*	0.0470**	0.0440**	0.0548**	0.0515**	0.0563**	0.0532**
	(0.023)	(0.037)	(0.057)	(0.033)	(0.045)	(0.021)	(0.031)	(0.018)	(0.025)
Combined_liquidity	0.1191***	0.1178***	0.1174***	0.1206***	0.1159***	0.1232***	0.1250***	0.1254***	0.1214***
	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.008)	(0.007)	(0.007)	(0.009)
Same_Industry	0.0072	0.0042	0.0059	0.0070	0.0045	0.0026	0.0040	0.0052	0.0026
	(0.248)	(0.495)	(0.341)	(0.256)	(0.469)	(0.692)	(0.551)	(0.431)	(0.701)
Deal_Value	0.0374***	0.0335**	0.0313**	0.0320**	0.0349***	0.0230	0.0232	0.0223	0.0247*
	(0.005)	(0.012)	(0.020)	(0.018)	(0.009)	(0.121)	(0.120)	(0.140)	(0.096)
Stock_Deal	-0.0163**	-0.0183***	-0.0160**	-0.0161**	-0.0173**	-0.0158**	-0.0142*	-0.0140*	-0.0151**
	(0.022)	(0.009)	(0.023)	(0.023)	(0.014)	(0.036)	(0.060)	(0.065)	(0.045)
Intense_Monitoring						0.0000	0.0011	0.0011	0.0000
						(0.999)	(0.883)	(0.8800)	(0.995)
Board_Size						0.0004	0.0010	0.0006	0.0004
						(0.741)	(0.397)	(0.594)	(0.704)

Table 7 : Effect of Acquirer's CEO Centrality on Combined Cumulative Abnormal Returns (contd.)

Model	(1)	(2) Closeness	(3) Degree	(4) Betweenness	(5) Eigenvector	(6) Closeness	(7) Degree	(8) Betweenness	(9) Eigenvector
Duality						0.0060	0.0068	0.0060	0.0059
						(0.377)	(0.321)	(0.379)	(0.385)
Eindex						0.0021	0.0026	0.0028	0.0021
						(0.385)	(0.289)	(0.253)	(0.386)
Age						-0.0002	-0.0002	-0.0001	-0.0002
						(0.667)	(0.682)	(0.806)	(0.640)
Block_Ownership						0.0046	0.0043	0.006	0.0044
						(0.606)	(0.633)	(0.529)	(0.621)
CEO_Ownership						-0.1554*	-0.1586*	-0.1371*	-0.1481*
						(0.054)	(0.050)	(0.090)	(0.066)
Constant	-0.0268*	0.0167	0.0180	0.0022	0.0194	0.0061	0.0005	-.01510	0.0102
	(0.075)	(0.360)	(0.357)	(0.904)	(0.311)	(0.871)	(0.989)	(0.663)	(0.788)
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	776	776	776	776	776	685	685	685	685
Adjusted R^2	4.78%	6.76%	6.25%	5.57%	6.54%	7.55%	7.14%	7.58%	7.45%

****, **, * Denotes statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 8 : Effect of Acquirer's CEO Centrality on Target Cumulative Abnormal Returns

This table presents the estimates of OLS regression for target cumulative abnormal returns on measures of centrality for acquirer CEO and control variables. The dependent variable is the target CAR over the three day window surrounding the merger announcement. Centrality of the acquirer CEO is measured by Closeness in models 2 and 6, Degree in models 3 and 7, Betweenness in models 4 and 8, and Eigenvector in models 5 and 9. All other variables are as previously defined. The size, profitability, Tobin's Q, leverage, and liquidity are calculated for the target firm. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P-values are in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
		Closeness	**Degree**	**Betweenness**	**Eigenvector**	**Closeness**	**Degree**	**Betweenness**	**Eigenvector**
Centrality		0.1120*	0.1376**	0.0646	0.1306**	0.1063	0.1263*	0.0550	0.1279*
		(0.068)	(0.035)	(0.244)	(0.047)	(0.110)	(0.082)	(0.365)	(0.072)
Size	-0.0192**	-0.0220***	-0.0232***	-0.0203***	-0.0218***	-0.0210**	-0.0212**	-0.0195**	-0.0209**
	(0.011)	(0.004)	(0.003)	(0.008)	(0.004)	(0.022)	(0.021)	(0.033)	(0.023)
Profitability	-0.0000	-0.0000	-0.0000	-0.0000	-0.0000	0.0000	0.0000	0.0000	0.0000
	(0.991)	(0.943)	(0.950)	(0.952)	(0.917)	(0.921)	(0.903)	(0.877)	(0.951)
Tobin's Q	-0.0099*	-0.0125**	-0.0126**	-0.0108*	-0.0126**	-0.0130**	-0.0131**	-0.0115*	-0.0131**
	(0.098)	(0.043)	(0.039)	(0.075)	(0.041)	(0.046)	(0.044)	(0.072)	(0.042)
Leverage	0.0051	0.0144	0.0212	0.0093	0.0169	0.0474	0.0534	0.0418	0.0499
	(0.930)	(0.804)	(0.715)	(0.872)	(0.771)	(0.447)	(0.394)	(0.502)	(0.424)
Liquidity	-0.2784***	-0.2598***	-0.2592***	-0.2732***	-0.2598***	-0.1957***	-0.1956***	-0.2068***	-0.1943***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.010)	(0.010)	(0.006)	(0.010)
Deal_Value	-0.0754**	-0.0656**	-0.0604**	-0.0682**	-0.0668**	-0.0514	-0.0500	-0.0555	-0.0523
	(0.012)	(0.031)	(0.050)	(0.026)	(0.027)	(0.164)	(0.176)	(0.136)	(0.155)
Same_Industry	0.0076	0.0154	0.0146	0.0092	0.0157	0.0090	0.0073	0.0031	0.0099
	(0.751)	(0.527)	(0.545)	(0.702)	(0.517)	(0.733)	(0.781)	(0.906)	(0.709)
Stock_Deal	-0.0802***	-0.0723***	-0.0752***	-0.0785***	-0.0739***	-0.0884***	-0.0905***	-0.0942***	-0.0894***
	(0.004)	(0.009)	(0.006)	(0.004)	(0.008)	(0.004)	(0.003)	(0.002)	(0.003)
Intense_Monitoring						0.0050	0.0023	0.0024	0.0051
						(0.865)	(0.937)	(0.934)	(0.862)
Board_Size						0.0019	0.0007	0.0016	0.0018
						(0.670)	(0.877)	(0.726)	(0.679)
Duality						-0.0272	-0.0293	-0.0265	-0.0271
						(0.311)	(0.277)	(0.326)	(0.313)
Eindex						-0.0048	-0.0054	-0.0065	-0.0045
						(0.616)	(0.571)	(0.494)	(0.639)

Table 8 : Effect of Acquirer's CEO Centrality on Target Cumulative Abnormal Returns (contd.)

Model	(1)	(2) Closeness	(3) Degree	(4) Betweenness	(5) Eigenvector	(6) Closeness	(7) Degree	(8) Betweenness	(9) Eigenvector
Age						0.0011	0.0011	0.0009	0.0012
						(0.583)	(0.577)	(0.633)	(0.545)
Block_Ownership						-0.0654*	-0.0647*	-0.0669*	-0.0649*
						(0.068)	(0.071)	(0.062)	(0.070)
CEO_Ownership						0.1523	0.1631	0.1257	0.1388
						(0.636)	(0.613)	(0.696)	(0.666)
Constant	0.5045***	0.4277***	0.4073***	0.4542***	0.4103***	0.3527**	0.3469**	0.4032***	0.3270**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.016)	(0.017)	(0.004)	(0.028)
Industry Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	776	776	776	776	776	685	685	685	685
Adjusted R^2	9.05%	9.34%	9.47%	9.10%	9.41%	7.72%	7.79%	7.48%	7.82%

****, **, * Denotes statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 9: Effect of Board Constraints and CEO Characteristics on Likelihood of Acquisition

This table summarizes the coefficients of the explanatory variables of the Probit model of acquisitions while considering the effect of board constraints and CEO characteristics. The dependent variable is the probability that the firm announced a successfully completed acquisition of a US public target. High_Centrality is a dummy variable that equals one if the CEO centrality is above the sample median and zero otherwise. The centrality is measured using Closeness in column 1, Degree in column 2, Betweenness in column 3, and Eigenvector in column 4. Intense_Monitoring is a dummy variable that equals 1 if more than 50% of the board directors are classified as intense monitors and zero otherwise, High_Centrality * Intense_Monitoring is an interaction term between High_Centrality and Intense_Monitoring, Small_Board is a dummy variable that equals 1 if the board size is less than eight and zero otherwise, High_Centrality * Small_Board is an interaction term between High_Centrality and Small_Board, CEO_not_Chair is a dummy that equals one if the CEO is not the chairman of the board and zero otherwise, High_Centrality * CEO_not_Chair is an interaction term between High_Centrality and CEO_not_Chair, Low_ Eindex is a dummy variable that equals 1 if Bebchuk, Cohen and Ferrell's (2009) entrenchment index is lower than the sample median and zero otherwise, High_Centrality * Low_Eindex is an interaction term between High_Centrality and Low_Eindex , Older_CEO is a dummy variable that equals 1 if the CEO's age is above the sample median and zero otherwise, High_Centrality * Older_CEO is an interaction term between High_Centrality and Older_CEO, Block_Ownership is a dummy variable that equals one if there is at least one block holder that owns 5% or more of the common shares outstanding and zero otherwise, High_Centrality * Block_Ownership is an interaction term between High_Centrality and Block_Ownership, High_CEO_Ownership is a dummy variable that equals one if the CEO's percentage ownership of firm's common stock is higher than the sample median and zero otherwise , High_Centrality * High_CEO_Ownership is an interaction term between High_Centrality and High_CEO_Ownership. The models include controls for size, profitability, Tobin's q, leverage, and liquidity. All independent variables and controls are lagged one year. P-values are in parentheses.

	(1) Closeness	(2) Degree	(3) Betweenness	(4) Eigenvector
High_Centrality	0.1813***	0.1948***	0.0856**	0.1855***
	(0.000)	(0.000)	(0.041)	(0.000)
Intense_Monitoring	-0.2889***	-0.2507***	-0.3610***	-0.3181***
	(0.000)	(0.000)	(0.000)	(0.000)
High_Centrality * Intense_Monitoring	0.1422*	0.0827	0.2583***	0.1927**
	(0.090)	(0.323)	(0.001)	(0.010)
High_Centrality	0.1078**	0.1490***	0.0612	0.1440***
	(0.031)	(0.004)	(0.194)	(0.003)
Small_Board	-0.1461**	-0.0588	-0.0477	-0.1142*
	(0.031)	(0.377)	(0.453)	(0.093)
High_Centrality * Small_Board	0.3572***	0.2050**	0.1986**	0.2886***
	(0.000)	(0.012)	(0.012)	(0.001)
High_Centrality	0.2427***	0.2866***	0.1044**	0.2353***
	(0.000)	(0.000)	(0.011)	(0.000)
CEO_Not_Chair	0.0220	0.0912	-0.0773	-0.0321
	(0.716)	(0.135)	(0.152)	(0.551)
High_Centrality *	-0.0420	-0.1503*	0.1245*	0.0395

CEO_Not_Chair	(0.586)	(0.053)	(0.053)	(0.545)
High_Centrality	0.1713**	0.1983***	0.0329	0.1800***
	(0.017)	(0.006)	(0.463)	(0.000)
Low_Eindex	0.0232	0.0558	-0.0632	-0.0120
	(0.731)	(0.416)	(0.244)	(0.826)
High_Centrality * Low_Eindex	0.0891	0.0369	0.2354***	0.1374**
	(0.298)	(0.668)	(0.000)	(0.018)
High_Centrality	0.1833***	0.1748***	0.0911**	0.2043***
	(0.000)	(0.001)	(0.029)	(0.000)
Older_CEO	-0.1991***	-0.2237***	-0.2784***	-0.2214***
	(0.001)	(0.000)	(0.000)	(0.000)
High_Centrality * Older_CEO	0.1035	0.1297*	0.2185***	0.1419**
	(0.183)	(0.099)	(0.001)	(0.035)
High_Centrality	0.1990***	0.1933***	0.0890**	0.2096***
	(0.000)	(0.000)	(0.027)	(0.000)
Block_Ownership	-0.1195*	-0.1041	-0.1980***	-0.1386**
	(0.082)	(0.126)	(0.002)	(0.036)
High_Centrality * Block_Ownership	0.1400	0.1151	0.2699***	0.1843**
	(0.119)	(0.200)	(0.001)	(0.028)
High_Centrality	0.2293***	0.2173***	0.0829*	0.2108***
	(0.000)	(0.000)	(0.057)	(0.000)
High_ CEO_Ownership	-0.0360	-0.0458	-0.1451***	-0.0868
	(0.576)	(0.478)	(0.008)	(0.123)
High_Centrality * High_ CEO_Ownership	0.0282	0.0343	0.1960***	0.1169*
	(0.729)	(0.674)	(0.003)	(0.079)

****, **, * Denotes statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 10: Effect of Board Constraints and CEO Characteristics on Acquirer Cumulative Abnormal Returns

This table summarizes the coefficients of the explanatory variables in the OLS regression for acquirer cumulative abnormal returns on measures of centrality for acquirer CEO, board constraints, CEO characteristics, and other control variables. The dependent variable is the acquirer CAR over the three day window surrounding the merger announcement. All models include controls for bidder's size, profitability, Tobin's q, leverage, and liquidity. The centrality is measured using Closeness in column 1, Degree in column2, Betweenness in column3, and Eigenvector in column 4. All independent variables and controls are lagged one year. All models include industry and fixed year effects. P-values are in parentheses.

	(1) Closeness	(2) Degree	(3) Betweenness	(4) Eigenvector
High_Centrality	-0.0108	-0.0189***	-0.0051	-0.0143**
	(0.109)	(0.006)	(0.427)	(0.035)
Intense_Monitoring	0.0017	-0.0029	-0.0111	0.0043
	(0.884)	(0.801)	(0.312)	(0.694)
High_Centrality * Intense_Monitoring	-0.0116	-0.0027	0.0059	-0.0161
	(0.369)	(0.832)	(0.647)	(0.211)
High_Centrality	-0.0197***	-0.0147*	-0.0104	-0.0167**
	(0.010)	(0.054)	(0.132)	(0.027)
Small_Board	-0.0190**	-0.0008	-0.0176*	-0.0050
	(0.043)	(0.930)	(0.064)	(0.602)
High_Centrality * Small_Board	0.0270**	-0.0132	0.0216*	-0.0026
	(0.039)	(0.308)	(0.091)	(0.844)
High_Centrality	-0.0125	-0.0136*	-0.0017	-0.0182**
	(0.119)	-0.09	(0.822)	(0.022)
CEO_Not_Chair	0.0022	0.0053	0.0027	0.0025
	(0.791)	(0.520)	(0.751)	(0.771)
High_Centrality * CEO_Not_Chair	-0.0092	-0.0174	-0.0087	-0.0079
	(0.443)	(0.149)	(0.473)	(0.509)
High_Centrality	-0.0137	-0.0072	-0.0013	-0.0119
	(0.161)	(0.466)	(0.893)	(0.219)
Low_Eindex	-0.0128	-0.0022	-0.0094	-0.0067
	(0.118)	(0.786)	(0.254)	(0.406)
High_Centrality * Low_Eindex	0.0034	-0.0191	-0.0048	-0.0107
	(0.778)	(0.113)	(0.687)	(0.367)
High_Centrality	-0.0136	-0.0181**	0.0013	-0.0234***
	(0.119)	(0.041)	(0.881)	(0.009)
Older_CEO	0.0067	0.0072	-0.0050	0.0016
	(0.417)	(0.390)	(0.563)	(0.842)
High_Centrality * Older_CEO	-0.0041	-0.0032	0.0116	0.0052
	(0.731)	(0.785)	(0.174)	(0.662)

High_Centrality	-0.0137*	-0.0220***	-0.0059	-0.0195***
	(0.053)	(0.002)	(0.363)	(0.006)
Block_Ownership	-0.0036	-0.0062	-0.0018	-0.0035
	(0.703)	(0.517)	(0.861)	(0.720)
High_Centrality * Block_Ownership	0.0098	0.0154	0.0063	0.0085
	(0.485)	(0.271)	(0.652)	(0.547)
High_Centrality	-0.0134	-0.0193**	-0.0136	-0.0101
	(0.152)	(0.039)	(0.262)	(0.269)
High_ CEO_Ownership	0.0016	-0.0007	-0.0006	0.0105
	(0.858)	(0.935)	(0.944)	(0.221)
High_Centrality * High_ CEO_Ownership	-0.0054	-0.0011	0.0009	-0.0237*
	(0.659)	(0.930)	(0.940)	(0.052)

****, **, * Denotes statistical significance at the 1%, 5%, and 10% levels, respectively.*

Table 11: Effect of Acquirer's CEO Centrality on Probability of the Bidder Being Subsequently Acquired

This table presents the estimates of the Probit model of likelihood of bidder becoming a successfully acquired target. The model is conducted on a subsample of successfully completed acquisitions by S&P 1500 bidders of US public targets within the first six years of the sample (January 1st 2000- December 31st 2005) . Deals are restricted to include acquisitions where targets represent at least 5% of the market value of the bidders. The dependent variable is a dummy variable that equals one if the bidder becomes a successfully acquired target within a five year window of the date of merger announcement and zero otherwise. Centrality of the acquirer's CEO is measured by Closeness, Degree, Betweenness, and Eigenvector in columns 1, 2, 3, and 4, respectively. CAR is the Cumulative abnormal returns for the acquirer surrounding a three day window of the merger announcement. If the bidder has more than one deal during this subsample, then CAR represents the sum of the CARs of those deals. Centrality * CAR is an interaction term between the acquirer CEO Centrality and CAR. Relative_Target_Size is the market value of the target divided by the market value of the bidder. All other variables are as previously defined. All independent variables and controls are calculated at one year before the beginning of the sample. P-values are in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**
	Closeness	**Degree**	**Betweenness**	**Eigenvector**
Centrality	0.6777	0.3231	0.5380	0.3462
	(0.174)	(0.511)	(0.168)	(0.488)
CAR	-6.6713**	-7.4001*	-6.5628	-7.4226*
	(0.042)	(0.066)	(0.121)	(0.059)
Centrality * CAR	10.4878**	9.9764**	8.2805*	9.7070**
	(0.030)	(0.049)	(0.092)	(0.048)
Size	-0.1521***	-0.1393**	-0.1388**	-0.1419**
	(0.009)	(0.021)	(0.016)	(0.013)
Profitability	-2.7693**	-2.5605**	-2.6226**	-2.9475**
	(0.021)	(0.030)	(0.027)	(0.015)
Tobin's Q	-0.0096	-0.0087	-0.0097	-0.0086
	(0.601)	(0.636)	(0.598)	(0.636)
Leverage	0.1183	0.0876	0.0992	0.0428
	(0.842)	(0.883)	(0.866)	(0.942)
Relative_Target_Size	-1.2930**	-1.4130***	-1.2432**	-1.2286**
	(0.014)	(0.009)	(0.018)	(0.018)
Constant	0.7087	0.8259	0.5938	0.8153
	(0.195)	(0.129)	(0.290)	(0.178)
N	222	222	222	222
Pseudo R^2	7.63%	7.57%	7.55%	7.07%

****, **, * Denotes statistically significant at the 1%, 5%, and 10% levels, respectively.*

Table 12 : CEO Turnover Analysis

This table presents the results of Probit estimation applied on the subsample of acquirers that announced completed acquisitions of US public targets between January 1st 2000 and December 30th 2005. This sample is also restricted to include targets that represent at least 10% of the market value of acquirer. The dependent variable is a dummy variable that equals 1 if there is a disciplinary CEO turnover within a 5 year window from the date of first merger announcement and zero otherwise. Disciplinary turnover is as defined in section 5.3. High_Centrality is a dummy variable that equals 1 if the centrality is above the sample median and zero otherwise. Centrality is measured using Closeness in model 1, Degree in model 2, Betweenness in model 3, and Eigenvector in model 4. CAR is the 3 day cumulative abnormal returns around the first merger announcement. High_Centrality * CAR is an interaction term between High_Centrality and CAR. Pre_ROA (3) is the average of 3 year firm's return on assets prior to the merger announcement. Post_ROA (3) is the average of 3 year firm's return on assets after the merger announcement. Age is the age of the CEO. Tenure is the tenure of the CEO. Stock_Deal is a dummy that equals 1 if the deal is entirely financed by stock and zero otherwise. Relative_Target_Size is the market value of the target divided by the market value of the acquirer before the first merger announcement. Firm_Got_Acquired is a dummy variable that equals 1 if the firm got acquired within a 5 years window and zero otherwise. P-values are included in parentheses.

Model	**(1)**	**(2)**	**(3)**	**(4)**
	Closeness	**Degree**	**Betweenness**	**Eigenvector**
High_Centrality	0.7738***	0.7284***	0.4477*	0.3387
	(0.001)	(0.002)	(0.051)	(0.122)
CAR	-2.4099	-2.2915	-2.7514*	-0.5192
	(0.206)	(0.215)	(0.099)	(0.750)
High_Centrality * CAR	4.4347*	4.3782*	5.3283**	0.9627
	(0.071)	(0.073)	(0.023)	(0.666)
Pre_ROA(3)	-1.5726	-1.7082	-1.1153	-1.1217
	(0.258)	(0.221)	(0.412)	(0.401)
Post_ROA(3)	-0.5763	-0.4995	-0.5244	-0.4807
	(0.220)	(0.291)	(0.281)	(0.312)
Age	0.0052	0.0057	0.0052	0.0099
	(0.732)	(0.705)	(0.731)	(0.508)
Tenure	0.0215	0.0188	0.0150	0.0160
	(0.227)	(0.288)	(0.396)	(0.360)
Stock_Deal	-0.2928	-0.2354	-0.2272	-0.1870
	(0.208)	(0.304)	(0.317)	(0.405)
Relative_Target_Size	0.0588	0.1752	0.0536	0.1065
	(0.917)	(0.760)	(0.925)	(0.847)
Firm_Got_Acquired	0.7772***	0.7548***	0.6857***	0.7980***
	(0.001)	(0.001)	(0.003)	(0.000)
Constant	-1.2551	-1.2648	-1.0697	-1.3201
	(0.133)	(0.132)	(0.189)	(0.111)
N	173	173	173	173
Pseudo R^2	13.58%	13.16%	11.38%	9.51%

****, **, * Denotes statistically significant at the 1%, 5%, and 10% levels, respectively.*

Table 13: Departed CEOs New Jobs

This table presents statistics on the jobs of the departed CEOs. Those CEOs constitute a subsample of bidders that announced completed acquisitions of US public targets between January 1st 2000 and December 30th 2005 and whose targets represent 10% of the market value of the bidder. Matching the bidder sample to ExecuComp results in 173 CEOs out of which 67 CEOs were forced to leave their position. Panel A classifies those CEOs based on their position in the new firm. Panel B compares the lateral shift in the new position of the CEO based on his centrality. Low Centrality is when the CEO's centrality is below the median's sample and High Centrality is when the CEO's centrality is above the sample's median.

Panel A : Distribution of CEOs new jobs

New position	Number of CEOs	% of Total departed CEOs
CEO	6	9%
CEO & Chairman	3	5%
CEO & President	4	6%
Chairman	8	12%
President	2	3%
Other in same company	7	10%
Executive in other companies	11	16%
Director in other companies	16	24%
No future job	10	15%
Total departed CEOs	67	100%

Panel B : Lateral shift in CEO's new position based on CEO centrality

	Low Centrality	High Centrality
	% of CEOs that had lateral shift in position	
Closeness	24%	35%
Degree	26%	33%
Betweenness	26%	34%
Eigenvector	19%	37%

IV. THE INFORMATION CONTENT OF SHAREHOLDER ACTIVISM IN MERGERS AND ACQUISITIONS

Abstract: We document that shareholder activism significantly affects takeover outcomes. Firms receiving shareholder proposals are 30% more likely to become a target of a subsequent completed acquisition. At the same time, target companies with previous shareholder proposals earn approximately 6% lower abnormal acquisition returns compared to the targets with no proposals. The higher acquisition likelihood and lower target returns are both more significant for the "relevant" shareholder proposals – those that are more recent and/or frequent, motivated by the removal of antitakeover provisions, as well as associated with the larger voting participation and/or larger proportion of votes cast in favor of the proposal. The above findings suggest shareholder activism facilitates functioning of the market for corporate control. Shareholder proposals may assist bidders in identification of targets suitable for (possibly disciplining) takeovers and/or signal the willingness to sell the shares held by potentially concerned target shareholders. One potential information channel that enables acquisitions is the common share ownership. We show that takeover likelihood increases the most for targets where the proposal sponsor also holds shares in the bidder firm.

1. Introduction

Support for shareholder proposals has increased dramatically since the shareholder proposal rule came into existence in 1943. Extensive finance research has been conducted on the trends of shareholder proposals over time, the support from management and the effect of such proposals on internal governance issues such as CEO turnover, executive compensation, as well as the value and efficiency of the firm (Gillan and Starks 2000, 2007; Morgan and Wolf 2006;

Thomas and Cotter 2007; Ertimur et al. 2010; Renneboog and Szilagyi 2011). While proposal implementation by directors has grown over time (Brownstein and Kirman 2004; Morgan and Wolf 2006; Thomas and Cotter 2007), the evidence on the creation of shareholder value has been mixed. Some studies document little or no evidence of improvement in long-term stock returns performance or operating performance after activism (Karpoff et al. 1996; Song and Szewczyk 2003; Thomas and Cotter 2007), while others find improvement in long run operating performance or positive market returns (Brav et al. 2008; Klein and Zur 2009; Buchanan et al. 2010).[40,41]

There is relatively little empirical evidence on the impact of shareholder activism on takeover outcomes, even though many shareholder proposals are motivated by the removal of various antitakeover provisions such as poison pills, classified boards, supermajority requirements, etc.[42] This lack of evidence is particularly notable given that shareholder activism often represents a form of concern or outright dissatisfaction with the activities of firm's management (Gillan and Starks, 2000). As such, the existence of shareholder proposals should have the potential to influence the likelihood of the company becoming a takeover target, as they can be considered a factor facilitating external governance mechanisms designed to correct

[40] Some researchers further document positive short-term market reaction to the announcement of certain types of shareholder activism (Strickland et al. 1996; Smith 1996). However, Gillan and Starks (2000) argue that no definitive conclusions can be made using short-term stock market reaction to measure the impact of activism.

[41] Shareholder activism tends to be associated with improved internal governance. For example, Buchanan et al. (2010) show that firms with active shareholders are more likely to force CEO turnovers and have more independent boards. Del Guercio et al. (2008) explore "just vote no" campaigns, where active shareholders show their dissatisfaction by abstaining from director elections. The authors document improvements in operating performance and involuntary CEO turnovers.

[42] Several studies expect the link between shareholder proposals and acquisition outcomes. For example, Greenwood and Schor (2009) argue that the lack of evidence of significant value creation following the shareholder proposals is due to the acquisition of many firms targeted by shareholder activism.

internal governance problems. If managers commit to value-enhancing policies as the response to the proposal, the likelihood of the subsequent acquisition declines.[43] On the other hand, shareholder proposals may increase the chances of subsequent acquisitions if the management is unable or unwilling to commit to value-improving activities. Shareholder activism – both the existence of proposals and the subsequent voting outcome - can help potential bidders to identify the suitable targets of acquisitions - especially disciplining takeovers designed to reverse internal governance failures and discipline target managements (Shleifer and Vishny 1997; Jensen 1986, 1988).[44] Levit and Malenko (2011) in fact argue that shareholder proposal voting has a signaling value not only for the firm's management, but also for the potential bidders.

The existence of shareholder proposals should also influence the abnormal returns accrued to targets of completed acquisitions. Target shareholders may benefit from potentially higher incidence of multiple bidders attracted by the existence of the proposal. On the other hand, shareholder proposals may signal the existence of the group of target shareholders willing to sell (and thus having low reservation values) and/or may limit the power of target management to negotiate higher premiums. Both of the above reasons have been associated with lower target acquisition gains (Stulz, et al., 1990; Song and Walkling, 1993).

In this paper, we utilize the comprehensive sample of corporate-governance-oriented shareholders proposals from Georgeson's annual reviews to study the link between shareholder activism and takeover outcomes. Our sample covers S&P 1500 firms from 1996 to 2009, during

[43] The same effect would be observed even in cases when the management adopts policies designed to further entrench itself as the response to the takeover proposal. We do not consider this outcome likely given the recent evidence of non-confrontational attitude of managers toward shareholder activism (Brownstein and Kirman, 2004).

[44] Disciplining takeovers occur to eliminate inefficient target management who do not maximize shareholder wealth, and are generally associated with both gains to target shareholders and positive overall acquisition synergies (Kini et al. 2004; Scharfstein 1998; Weisbach 1993; Jensen 1988).

which 755 companies received 3,631 shareholder proposals. Unlike previous studies that focus on the types of shareholder proposals (e.g. Ertimur et al. 2010; Renneboog et al. 2011) we examine the impact of shareholder-voter turnout (or voting participation), the percentage of favorable votes, and the "relevance" of each proposal, and associate proposal characteristics and voting outcomes to the future probability of corporate control market activities. More specifically, we study the impact of proposals motivated by the removal of antitakeover provisions, the role of the frequency and timing of proposals, as well as the influence of voter participation and voter preference (proportion of votes cast in favor of the proposal) on takeover outcomes. In order to test the possible information communication channels that facilitate acquisition processes, we also study the effects of shareholder proposals by sponsors who hold shares in both the target and the bidder firms.

Based on the analysis of the sample of 3,631 proposals received by 755 firms, the main results of our study are:

- Controlling for known determinants of takeover likelihood,[45] shareholder activism significantly increases chances of subsequent completed acquisition. Firms receiving shareholder proposals are associated with approximately 30% relatively higher chance of becoming a target of a subsequent completed acquisition.

[45] Factors typically used in the literature to investigate the probability of takeover include company specific characteristics such as : inefficiency of management (measured by firm performance; firms that underperform are more likely to be acquired), asset undervaluation (measured by market to book value ; firms with low market to book ratios represent bargains to bidders), firm size (larger firms are more costly to acquire) and leverage (leverage disciplines management) and industry effects (firms in industries with intense merger activity will more likely get acquired). See for example, Palepu (1986); Ambrose and Megginson (1992); Billet (1996); Billet and Xue (2007) Powel and Yanson (2007); Mitchell and Mulherin, (1996).

- Shareholder activism is associated with significantly smaller target abnormal acquisition returns. Target companies with previous shareholder proposals earn approximately 6% lower abnormal acquisition returns compared to the targets with no proposals.
- The higher acquisition likelihood and the lower target abnormal gains are primarily associated with proposals that are more recent, more frequent, motivated by the removal of antitakeover provisions, as well as proposals associated with the larger voting participation and the larger proportions of votes cast for the proposal.
- Takeover likelihood increases the most for targets where the proposal sponsor also holds shares in the bidder firm.

Overall, the results of our study suggest that shareholder activism facilitates functioning of the market for corporate control. Since corporate takeovers have the power to limit value-destroying self-serving activities of management (Grossman and Hart, 1980), our study implies that shareholder proposals support external governance, in addition to improved internal governance documented by the previous research.

The rest of the paper is organized as follows: Hypotheses are presented in Section 2. Section 3 describes data and methodology. Section 4 presents the results. Section 5 concludes.

2. Hypotheses

2.1. Takeover Likelihood

Shareholder activism is often the consequence of concerns or dissatisfaction of firm owners with the activities of the management (Gillan and Starks, 2000). Since shareholder proposals are highly visible events for all (including the external) market participants, it is likely

that they affect external corporate governance and influence the takeover likelihood. If managers consider the proposal a "warning" that a (disciplining) takeover is possible (in which case they are likely to get replaced, see e.g. Shleifer and Vishny, 1997, or Grossman and Hart, 1980), they may be willing to commit to value enhancing activities, rendering the actual takeover less necessary, and less likely.[46] If, however, the managers are unable or unwilling to improve corporate values, shareholder activism – both the existence and the strength of support behind the proposals – may help bidders to identify prospective (disciplining) acquisition targets, leading to higher takeover likelihood. Levit and Malenko (2011) support this assumption – they show that shareholder proposal voting affects activities of the potential bidders. Ultimately, the impact of shareholder proposals on takeover likelihood is an empirical issue.

Hypothesis 1 [1A]: Shareholder activism is associated with increased [decreased] takeover likelihood.

2.2. Target Abnormal Acquisition Returns

Target abnormal returns increase in case of multiple bidder auctions (e.g. Stulz et al., 1990). Since shareholder activism is easily observable, firms receiving shareholder proposals may attract multiple bidders, and thus may experience larger target shareholder gains. However, Stulz et al. (1990) and Song and Walkling (1993) argue that in order to extract higher target abnormal returns, target managers must have strong power to negotiate with the bidders and target shareholders must have the ability to signal the high reservation price required for them to

[46] Safieddine and Titman (1999) show that managers of companies with ample free cash flows and lack of growth opportunities often pre-commit to leverage increases in order to defeat imminent takeover threat. The target shareholders still reap substantial gains, because the higher debt levels lead to optimal payment of the cash flows to the investors rather than suboptimal overinvestment, resulting in long-term improved corporate performance.

tender their shares. Since shareholder activism can leave target management weakened and can serve as a signal that potentially dissatisfied target investors are willing to sell for a relatively low price, target abnormal returns may be lower in case of firms affected by shareholder proposals. Ultimately, the impact of shareholder proposals on target abnormal acquisition gains is an empirical issue.

Hypothesis 2 [2A]: Shareholder activism is associated with lower [higher] target abnormal acquisition returns.

2.3. The Impact of Shareholder Proposal Characteristics and of the Support for the Proposal

Previous finance research documents that shareholder proposals have many motives. They can be driven by concerns over internal governance issues (such as executive compensation, board structure and independence, voting procedures), desires to affect firm activities (such as asset sales), or attempts to remove antitakeover barriers. Out of all the above reasons, we expect that proposals motivated by the removal of antitakeover provisions to be the most significantly related to the changes in takeover likelihood and abnormal target returns. Also, we predict that shareholder proposals should affect acquisition decisions if they were submitted more recently or if there were multiple shareholder proposals put forward. Ertimur et al. (2010) also show sponsors of shareholder proposals range from reputable investors and institutions with substantial investment experience to activist shareholders with non-business agendas or even individual investors without considerable business knowledge. We expect that more substantive proposals – that is those that draw larger shareholder voting participation and or larger fraction of votes in support – should be primarily associated with changes in takeover likelihood and changes in target acquisition gains.

Hypothesis 3: Changes in takeover likelihood and target acquisition abnormal returns should be more statistically significant for firms receiving shareholder proposals that are more recent, submitted by multiple sponsors, motivated by the removal of antitakeover provisions, as well as associated with larger shareholder participation and larger fraction of votes cast in favor of the proposal.

2.4. The Impact of Share Cross-Ownership by Shareholder Proposal Sponsors

Matvos and Ostrovsky (2008) show that ownership of shares in both the target and the bidder (share cross-ownership) is associated with greater target abnormal returns and greater voting support of cross-holding investors in favor of the acquisition.[47] If shareholder proposals are used by the market to identify possible takeover targets, we expect that cross-ownership by shareholder proposal sponsors can serve as a valuable information channel that helps the bidder to assess the suitability of a potential target firm. Alternatively, the cross-holding shareholder proposal sponsor may submit the proposal in the target company in anticipation of the subsequent takeover attempt, in order to reduce the cost of acquisition for the bidder.

Hypothesis 4: Changes in takeover likelihood and target acquisition abnormal returns should be more statistically significant for firms receiving shareholder proposals from sponsors holding shares both in the target and the bidder firms.

3. Data

3.1. Shareholder Proposals

[47] Harford, Jenter, and Li (2011) further document that the incidence of share cross-holdings increased rapidly over the last 20 years, mostly due to indexing and quasi-indexing. In contrast to Matvos and Ostrovsky (2008), though, Harford et al. (2011) find less evidence of meaningful impact of cross-holdings on acquisition outcomes.

We collect data on shareholder proposals from Georgeson's annual reviews from 1996 to 2009, which covers the companies from the S&P 1500 index. We obtain companies' names, the proposals, type of sponsors, votes cast for and against as a percentage of shares voted, and the votes cast for and against and abstentions as a percentage of the company's total voting power. Our sample contains 3631 proposals on 755 companies for the period spanning 1996 until 2009. Following Gillan and Starks 2000, we manually classify all shareholder proposals into 6 groups. In the Appendix Table A1, we list the types of proposals included under each of the six groups: 1) proposals related to repealing antitakeover devices; 2) voting issues; 3) board and committee independent issues; 4) other governance issues; 5) selling the company; and 6) other non-governance issues.

We conduct a number of univariate exercises to validate our data. The tables are included in the Appendix to improve the presentation and readability of the main paper. Table A2 reports the numbers of companies receiving proposals across the sample period (Panel A) and within a given year (Panel B). Similarly to Gillan and Starks (2000), about 61% of the 755 companies receiving proposals received more than one proposal over the sample period time. Moreover, companies do receive multiple proposals in one year. In attempts to understand what areas in governance are receiving the shareholders' interest and how this interest is evolving across time; we classify the proposals according to proposal type and year of submission in Table A3. Note first that the number of shareholder proposals submitted peaked in 2003. Goergeson reports that the reason for the decline in the 2004 proxy season is due to the Securities and Exchange Commission's access proposal that was published in October 2003 and which provides shareholders a method to add their nominees for director to company proxy statements. Another possible reason could be due to proposals withdrawals and omissions. Regarding which areas of

governance where receiving the greatest interest, at the beginning of the sample period, the shareholder proposals mainly focused on repealing anti-takeover devices (55%) and board independence issues (35%), while moving towards the end of the sample period time, proposals related to other issues increased dramatically (almost doubled starting from year 2003). This could be explained due to the emergence of debates surrounding issues related to executive compensation, especially equity based pay, in that time period. Another possible explanation for the different type of proposals submitted across the time is the identity of the proposal sponsor. Gillan and Starks (2000) point out that institution tend to address general governance problems (like repealing antitakeover provisions) arising from conflict of interest between management and shareholders, while individuals are the one who emphasize specific corporate governance issues like issues of executive compensation.

To describe the identity of proposal sponsors, we manually classify the proposal sponsors into 5 groups based on the information provided by Georgeson on names of sponsors as follows: Labor unions, public pensions, religious organizations, other shareholder groups and individuals. Table A4 presents the number of proposals over the sample period classified by sponsor type. Overall, the largest percentage of proposals (about 43%) is sponsored by individuals, followed by labor unions (37%). Consistent with Gillan and Starks (2000), there is a variation in the number of proposals submitted by institutions. In the period 1996-1999, both labor unions and public pensions were sponsoring more proposals, but starting from 2000, the proposals sponsored by pension fund decreases dramatically and the sponsors sponsored by labor unions decreased in 2000, increased in 2003 and then decreased again in 2004. The percentage of proposals sponsored by individuals was varying until year 2006 when that percentage became more consistent.

Overall, the above exercises confirm that our data is consistent with those used in prior studies, even though we hand collected the data from a different data source, Georgeson, who specializes in tracking corporate governance proposals, and hand classified the data according to prior research.

We now introduce our main variables in this study. Table 1 tallies total shareholder-voter participation, defined as voter turnout divided by all voting shares outstanding. Those statistics are broken down based on sample year (Panel A), sponsor type (Panel B), and proposal type (Panel C). Table 2 repeats Table 1, but with "Favorable Votes", calculated as the number of "Yes" vote a percentage of all votes casted. On average, voter turnout is around 87%, with no detectable fluctuations over time, and favorable votes are around 36%. This proportion is higher than the 23% mean of votes in favor reported by Gillan and Starks (2000) for proposals submitted during 1987- 1994, but is consistent with Renneboog and Szilagyi (2011) who report a mean of 34% for proposals submitted between 1996 and 2005. Table 2 Panel B classifies the votes in favor by proposal sponsor. Proposals sponsored by public pensions are those with the highest mean votes in favor (42.9%), followed by proposals sponsored by individuals (37.5%). Panel C classifies the votes in favor by proposal type. Proposals repealing anti-takeover devices are those with the highest mean votes in favor (56%), followed by proposals related to voting issues (40.7%). In unreported analysis, we decompose panels B and C by year but no significant variation occurs in the pattern of voting across time based on either proposal type or sponsor.

3.2. Takeover Targets

We use Securities Data Company (SDC) database to download all successful (completed) mergers and acquisitions that are either classified as mergers or acquisition of majority interest

and have US public targets where the date of original announcement is between January 1996 and December 2009. We also use COMPUSTAT to download the related financial data, Risk Metrics to download the related governance data, CRSP to download the stock prices, and Thomson Reuters to download ownership data.

We merge the SDC's universe of successful (completed) takeover bids spanning from January 1996 until December 2009, with the Georgeson sample of S&P 1500 firms with shareholder proposal and the COMPUSTAT data on all S&P 1500 firms. (Georgeson does not report CUSIPS, so we manually assign company CUSIPS by matching using company names). In that matching process, 48 of the 755 shareholder proposal firms did not have COMPUSTAT data, so we dropped them out of the sample.

Ultimately, we get four subsamples:

1- S&P 1500 firms with shareholder proposals that became targets of completed takeover bids.
2- S&P 1500 firms with shareholder proposals that did not become targets of completed takeover bids.
3- S&P 1500 control sample of firms with no shareholder proposals that became targets of completed takeover bids.
4- S&P 1500 control sample of firms with no shareholder proposals that did not become targets of completed takeover bids.

The final total sample of firms with shareholder proposals and control firms is 2600 firms with 18028 firm year observations. Analysis on voting outcome or participation includes 17985 observations since some proposals have missing voting data.

Table 3 presents the results of matching the shareholder proposal firms to SDC completed bids classified by the year of original announcement of takeover. 201 firms out of 755 firms end up as targets of completed takeovers. Those 201 firms have received a total of 697 proposals over the sample period of time. A firm that got acquired in the time period 2005-2009 received much more proposals compared to the firms that got acquired in earlier years. To further investigate the connection between the timing of the proposals and the acquisition event, we present in Table 4 the difference between the shareholder proposal date and the merger announcement date (elapsed time). Shareholder proposal date is the date of the annual corporate governance review as reported by Georgeson Inc. Merger announcement date is the original date of announcement as reported by SDC. If firms get successfully acquired, we shouldn't find proposals related to them after the date of merger announcement, but we actually find 93 proposals with dates after dates of merger announcement. Hence, we manually checked the narrative ("Deal Synopsis" variable in SDC) describing the takeover bids of those companies and found that those are companies that kept the target's name after the acquisition. Thus we drop those shareholder proposals out of the sample when conducting the analysis. 54.4% of the total proposals that matched with completed takeover bids occur between 0 and 36 months before the announcement of the takeover. This suggests that we could use a three year window before the merger announcement date to identify the proposals that are more relevant in explaining the likelihood and outcomes of takeover.

4. Results

4.1. Shareholder Activism and Takeover Likelihood

To model the impact of presence of shareholder activism on the probability of being acquired, we use a Probit model relating firm i's probability of takeover at time t, as a function of the presence of shareholder proposals, the firm's characteristics and control variables at t-1 as follows:[48]

$$TARGET_{i,t} = a + B_1PROPOSAL_{i,t-1} + B_2SIZE_{i,t-1} + B_3TOBIN'S\ Q_{i,t-1} + B_4PROFITABILITY_{i,t-1} + B_5LEVERAGE_{i,t-1} + B_6INDUSTRY_t + e_{i,t} \quad (1)$$

Where: $TARGET_{i,t}$ is a dummy variable that equals 1 for a company i that receives a bid in the year of announcement t and this takeover bid is successfully completed and 0 otherwise, $PROPOSAL_{i,t-1}$ is a dummy variable that equals one, if a company i has at least one proposal in the whole sample period until one year before date of takeover announcement t and 0 otherwise, $SIZE_{i,t-1}$ is the size of a company i at time t-1 measured as log of total sales, TOBIN'S $Q_{i,t-1}$ is the market to book ratio of a company i at time t-1, $PROFITABILITY_{i,t-1}$ is the net income before depreciation divided by average total equity (ROE) for a company i at time t-1, $LEVERAGE_{i,t-1}$ is the ratio of book value of total debt (long-term debt plus debt in current liabilities) divided by the market value of assets(book value of assets minus the book value of equity plus the market value of equity), and $INDUSTRY_t$ is the proportion of companies targeted in the same industry (2- digit SIC code) and same year t divided by all COMPUSTAT S&P1500 firms targeted in the same year t.

In addition, we measure the effect of shareholder activism by either employing shareholder votes in favor or the level of shareholder participation in votes as explanatory variables. We measure those variables as follows: VOTES_FOR: The mean of votes in favor for

[48] The model we use is based on the previous studies of determinants of acquisition likelihood: Palepu (1986); Billet (1996); Billet and Xue (2007)

all shareholder proposals issued by the company during the sample period until one year before the announcement of the takeover bid, where votes in favor is a ratio of all the votes in favor divided by all votes casted. PARTICIPATION: The mean of participation in voting of all shareholder proposals issued by the company during the sample period until one year before the announcement of the takeover bid, where the participation is all votes cast at the meeting divided by the total voting power of the company.

Next, to model the influence of specific proposals characteristics such as multiple proposals, recent proposals, and proposals motivated by antitakeover provision removal, we employ a model similar to model (1). However we apply this model only on the universe of firms with shareholder proposals. The reason we do not include those variables in the general model above is that no control firms can have those characteristics, thus the power of the model will be reduced. In addition, focusing only on firms with shareholder proposals will eliminate any endogeneity problems that result from the fact that firms with shareholder proposals are different from other firms. We use variable MULTIPLE that is a dummy variable equal to 1 if the company has multiple shareholder proposals during the sample period and 0 otherwise to measure the frequency of proposals. We also use a variable TAKEOVER – RELATED that is a dummy variable equal to 1 if the company has at least one proposal that is related to the five most influential takeover related proposals (repeal classified board, eliminate poison pill, eliminate supermajority requirement , cumulative voting and sell the company) and 0 otherwise to measure the proposal type. To examine the impact of proposals submitted more recently before the takeover announcement, we use a dummy variable RECENT equal to 1 if the shareholder proposal is in a window of 3 years before the announcement of the takeover bid and 0 otherwise.

Table 5 reports the results of the Probit estimation of model (1). Column 1 includes only firm characteristics and control variables at time t-1 as in the classical models of takeover prediction (Palepu, 1986; Billet, 1996; Billet and Xue, 2007). Columns 2, 3 and 4 include shareholder activism as an explanatory variable. Shareholder activism is measured by the existence of shareholder proposals (Column 2), the voting results in favor of the proposal (Column3), and the participation in the voting on the proposal (Column4).

Regarding the impact of shareholder activism on the likelihood of takeovers, the results strongly support Hypotheses 1 and 3. Firms with active shareholders have higher probability of being taken over, if shareholder activism is measured by the proposal existence, shareholder votes in favor for a proposal, or shareholder participation in voting on a proposal. The (statistically highly significant) marginal effect on PROPOSAL in models 2, 3, and 4 is 1.5%, 2.5%, and 1.7%, respectively. Since the unconditional probability of an acquisition of a firm in the sample equals 5.25% in a given year, a firm with shareholder proposals has relatively 28.4% higher likelihood of being successfully taken over compared to firms with no proposals. In addition, the successful voting outcome and participation in voting result in 47.3% and 31.8% higher probability of being successfully taken over, respectively.

The control variables in Table 5 have generally similar signs and significance compared to the previous models testing the determinants of acquisition likelihood. Smaller, more profitable, less levered firms with low Tobin's Qs have the higher chance of being taken over. In addition, the takeover likelihood for a given firm increases if other firms in the same industry are targeted in the same year.

Table 6 reports the results of the Probit estimation on the universe of firms with shareholder proposals as reported by Georgeson. Each of the first 3 models tests for the influence of the characteristics of the proposals on the takeover probability. The marginal coefficients on MULTIPLE, TAKEOVER-RELATED, and RECENT in models 1, 2, and 3 are 3.5%, 3.7%, and 4.4%, respectively. In the universe of firms with shareholder proposals, the unconditional probability of an acquisition of a firm is 2.6%. Consequently, having multiple proposals, takeover-related proposals, and proposals in a 3 year window prior to the announcement of a merger leads to a 134%, 142%, and 168% higher probability of a firm being acquired in a given year.

Model 4 controls for the possibility that the coefficient on RECENT is positive primarily due to the recent quality of firm's governance. Therefore, we add the measure of governance – the G-INDEX (Gompers, Ishii and Metrick governance index) as reported by Risk Metrics. Even after controlling for this variable, RECENT stays statistically significant.

Finally, Models 5 and 6 test for the possibility that the takeover likelihood for firms with shareholder proposals aimed on the removal of antitakeover provisions increases solely due to the mere removal of given provisions following the passage of proposal or extraordinary large shareholder participation (which likely forces the management to remove the antitakeover provisions even if the original proposal does not pass). We thus include variables WIN and LARGE PARTICIPATION. WIN is a dummy variable that equals one if the company has on average 50% or more of the votes supporting the proposal and zero otherwise and LARGE_PARTICIPATION is a dummy variable that equals one if the company has on average shareholders participating in the voting greater than 75% distribution of the sample and zero

otherwise. About 31% of the shareholder proposal firms have 50% or more of the votes supporting the proposal and 29% of the sample are greater than 75% distribution of the sample with respect to participation in voting on the proposals. Models 5 and 6 show that even after controlling for high support from shareholders (WIN) or large participation in voting (LARGE_PARTICIPATION); the presence of any antitakeover-related shareholder proposal is still significant: hence shareholder activism itself serves as a signal that increases the possibility of takeover, not just the presence of winning proposals.

4.2. Shareholder Activism and Target Abnormal Acquisition Returns

We employ a standard event study methodology based on the market model and using returns on the CRSP equally – weighted portfolio to calculate the cumulative abnormal returns (CARs) for targets surrounding the merger announcement. We then utilize an Ordinary Least Square Regression (OLS) to regress the CARs on the existence of shareholder activism and other control variables (as defined previously). The model is as follows:

$$CAR\ (-5, +5) = a + B_1PROPOSAL + B_2SIZE + B_3TOBINS'Q + B_4PROFITABILITY + e \qquad (2)$$

Where CAR (-5, +5) are the cross-sectional daily cumulative abnormal returns in a five day window surrounding merger announcement and all other variables as previously defined. We also apply this model using VOTES-FOR, PARTICIPATION, RECENT, WIN, and LARGE_PARTICIPATION as explanatory variables, to identify the effect of shareholder's support, shareholder's participation in voting, and recent proposals on the gains around merger announcement.

Table 7 presents the results of the OLS regression relating the cumulative abnormal returns surrounding a merger announcement to the existence of shareholder proposals (model 1), the support from shareholders for the proposals (model 2), the participation of the shareholders in voting on a proposal (model 3), the existence of shareholder proposals in a three year window prior to the announcement of the merger (model 4), the existence of shareholder proposals after controlling for high voting support (model 5) , and the existence of shareholder proposals after controlling for high participation in voting (model 6). The results provide strong support for Hypotheses 2 and 3. All six models show significant negative cumulative abnormal returns associated with firms that have shareholder proposals. Based on Model 1, target companies with previous shareholder proposals earn approximately 6% lower abnormal acquisition returns compared to the targets with no proposals. This could be due to the signaling value of the target shareholders' willingness to sell and/or weaker position of target management during negotiations over the distribution of takeover synergies. Models 2 and 3 suggest that lower abnormal returns to target shareholders are primarily due to previous proposals with large shareholder support and/or large shareholder voting participation. Model 4 shows that recent shareholder proposals are associated with low target gains. Last, based on Models 5 and 6, the lower target abnormal returns are not solely due to proposals that pass and/or draw extraordinary voting participation. Once again, it appears to be the mere existence of previous shareholder proposals that affects acquisition outcomes.

The coefficients for control variables in Table 7 have generally expected signs. Consistent with previous research, large targets, as well as targets with higher Tobin's Qs are associated with lower acquisition gains.

4.3. Shareholder Activism and Share Cross-Holdings of Proposal Sponsors

Previous finance research (e.g. Matvos and Ostrovsky, 2008) shows that companies holding shares in both the bidder and the target are more likely to vote in support of the acquisition. Cross-holdings are also expected to lead to higher target gains. We test whether cross-holdings may serve as the information link through which shareholder activism impacts takeover likelihood – if the existence of shareholder proposal serves as a signal that a company may be a possible target, the actual suitability for acquisition can be arguably best determined by investors who are familiar with both the bidder and the target thanks to the share cross-ownership. To test the impact of cross-holding on the takeover likelihood, we use a Probit model similar to model (1) but we add information links as an explanatory variable. We apply this model to a subset of the sample comprised of targets acquired by US public bidders and other shareholder proposal control firms, because one can observe share cross-holdings only if both the bidder and the target are publicly-held. We obtain ownership data for targets and bidders from 13-F reports provided by Thomson Reuters.

In the Probit model (1), we use INFO_LINK (1) as a dummy variable equal to one if the shareholder proposal sponsor in the target is also an owner in the bidder and zero otherwise. We further study another type of information link INFO_LINK (2) which is a dummy variable equal to 1 if the shareholder proposal sponsor in the target is an owner in the bidder and is also an active shareholder proposal sponsor in the bidder (measured by the existence of shareholder proposals in the bidder) and zero otherwise. To study the direct impact of cross-holdings, we also control for COMMON_OWNERSHIP which is a dummy variable equal to 1 if the target and bidder have owners in common and zero otherwise.

Table 8 presents the results of Probit model of takeover likelihood after accounting for information links that result due to having shareholder proposal sponsors of targets as other owners in bidders. The results support Hypothesis 4. The effect of information links is statistically positively significant when included as an explanatory variable (Model 1), when interacted with proposals that are related to anti-takeover provisions (Model 2) , when interacted with support of shareholders to the proposals (Model 3) , when interacted with participation of shareholders in voting on proposals (Model 4) , and after considering the alternative form of information link (INFO_LINK(2)) which shows that shareholder proposal sponsors in targets are owners and also active shareholder proposal sponsors in bidders (Model 5). In addition, Models 1-4 suggest that the higher takeover likelihood for companies with previous shareholder proposals (documented in Tables 5 and 6) is indeed mainly due to the target companies with owners holding share positions in the future bidders. After the inclusion of the information link, the presence of anti-takeover proposals (TAKEOVER-RELATED) keeps significance only when interacted with the presence of the information link.[49] The same effect can be found in the model examining the shareholder voting support for the proposal (VOTES_FOR), while participation in voting (PARTICIPATION) remains significant, but its coefficient is still smaller compared to the coefficient for PARTICIPATION interacted with the information link.

We also examine the impact of cross-holding on target abnormal acquisition gains. In Model 7 of Table 7, we add INFO_LINK (1) as the explanatory variable. This link can be observed only in case of acquisitions by publicly-traded US bidders. Therefore, we also include variable PUBLIC_US_BIDDER which is a dummy variable equal 1 if the bidder is a public US

[49] This result serves as yet additional piece of evidence that the higher takeover likelihood is not solely due to the removal of the anti-takeover provisions in future target firms.

bidder and zero otherwise to specifically control for the potentially different abnormal returns accrued to targets of US public bidders. Model 7 results show that cross-holdings is not significantly related to target abnormal acquisition gains. Utilizing the alternative definition of information link, INFO_LINK (2), or restricting the sample to only firms acquired by public US bidders leads to similar, statistically insignificant results.

5. Conclusion

The support for shareholder activism has increased substantially over time. Shareholder proposals have the power to improve internal governance, and there is some evidence that they lead to positive changes in corporate performance. So far, there has been little direct evidence that shareholder activism in future targets affects takeover outcomes– either via changes in the takeover likelihood or via different abnormal returns accrued by target companies that previously received shareholder proposals.

This study present evidence that shareholder activism both increases the likelihood of being taken over and lowers abnormal acquisition returns in case the company affected by the shareholder proposal becomes the target of ultimately completed acquisition. The results further suggest that the most significant changes in takeover likelihood and target gains are associated with proposals that were submitted more recently, by multiple sponsors, motivated by the removal of antitakeover provisions, as well as with proposals that received either large shareholder voting support of sizable voting participation. Takeover likelihood increases are further associated with acquisition where the sponsors of proposals in targets also hold bidder shares – suggesting that share cross-holdings may play an important role of information channel between the bidder and target companies.

Overall, the results of the study imply that shareholder activism affects functioning of the market for corporate control. Since the threat of takeovers disciplines managers and induces them to pursue policies enhancing investors' wealth, the existence of shareholder proposals improves the functioning of external governance factors (such as takeovers) in addition to the beneficial changes in internal governance documented by previous research.

Future research opportunities includes examining the relation between shareholder activism and changes in governance measured by changes in G-index, changes in ownership concentration, changes in adoption of poison pills, removals of anti-takeover amendments, and changes in leverage. In addition, another direction of future research may lead to the investigation of the impact of shareholder proposals taking into account the presence of significant debt holders including: banks, mutual funds, hedge funds, and pension funds.

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Table 1: Shareholder-Voter Turnout

Panel A presents descriptive statistics for the percentage (%) of shareholders who participated in voting for shareholder-initiated proposals. Sample includes 3587 proposals for which voting data is available. Panel B reports the percentages of support as Panel A, but the proposals are classified by sponsor type, for which data is available for 3574 proposals. Panel C classifies the 3587 proposals into 6 categories and presents similar statistics for each proposal type.

Panel A	**N**	**Mean**	**Median**	**Min**	**Max**
1996	111	90.66	91.3	63.3	100
1997	78	88.931	90.05	68.9	100
1998	62	90.90	92.8	57.2	100
1999	88	91.13	91	77.2	100
2000	83	87.93	88	69.1	100
2001	237	86.91	88.2	39.2	100
2002	271	85.79	86.9	55.6	100
2003	427	86.35	86.4	52.1	100
2004	412	86.21	87	55.7	100
2005	366	85.34	87.15	39.9	100
2006	382	87.07	87.7	54.1	100
2007	369	87.31	88.3	71.7	100
2008	334	88.22	89	68.6	100
2009	367	87.30	88.2	53.7	100
Total	3587	87.09	87.9	39.2	100

Panel B	**N**	**Mean**	**Median**	**Min**	**Max**
Proposals Sponsored by Labor Unions					
Total	1332	87.74	88.9	52.1	100
Proposals Sponsored by Public Pensions					
Total	192	86.86	88.65	57.2	100
Proposals Sponsored by Religious Organizations					
Total	167	88.36	88.1	57.2	100
Proposals Sponsored by Other Shareholder Groups					
Total	341	88.56	88.3	63.3	100
Proposals Sponsored by Individuals					
Total	1542	86.10	86.8	39.2	100

Panel C	**N**	**Mean**	**Median**	**Min**	**Max**
Anti-takeover devices	1075	87.34	88.5	39.2	100
Voting issues	487	87.52	88.8	39.9	100
Board & committee independence issues	598	87.13	87.3	39.9	100
Other governance issues	1346	86.71	87.2	50.1	100
Sell the company	68	87.54	89.25	65.6	100
Non governance issues	13	86.69	86.3	78.3	96.1

Table 2: Favorable Votes

Panel A presents descriptive statistics for the percentage (%) of shareholder votes in favor of shareholder-initiated proposals. Sample includes 3594 proposals for which voting data is available. Panel B reports the percentages of support as Panel A, but the proposals are classified by sponsor type, for which data is available for 2581 proposals. Panel C classifies the 3594 proposals into 6 categories and presents similar statistics for each proposal type.

Panel A	**N**	**Mean**	**Median**	**Min**	**Max**
1996	111	35.1	36.4	1.6	84.1
1997	82	28.1	26.9	1.6	67.8
1998	62	27.2	25.3	2.8	73.0
1999	88	33.7	30.9	1.9	95.8
2000	83	36.1	35.0	2.0	87.7
2001	238	29.1	26.7	0.9	97.1
2002	269	36.1	34.6	0.1	90.7
2003	427	36.0	33.9	2.3	90.1
2004	413	33.5	29.4	1.7	97.2
2005	366	35.7	36.3	0.0	97.6
2006	383	40.4	39.6	1.5	98.2
2007	371	36.6	36.5	0.3	91.1
2008	334	38.1	38.3	0.7	92.6
2009	367	43.4	42.9	1.3	98.9
Total	3594	36.3	36.3	0.0	98.9

Panel B	**N**	**Mean**	**Median**	**Min**	**Max**
Proposals Sponsored by Labor Unions					
Total	1335	36.9	37.5	0.1	95.1
Proposals Sponsored by Public Pensions					
Total	193	42.9	42.5	3.8	95.8
Proposals Sponsored by Religious Organizations					
Total	170	20.6	11.4	1.6	83.3
Proposals Sponsored by Other Shareholder Groups					
Total	342	32.8	32.9	0.3	97.1
Proposals Sponsored by Individuals					
Total	1541	37.5	36.9	0.0	98.2

Panel C	**N**	**Mean**	**Median**	**Min**	**Max**
Anti-takeover devices	1075	56.0	57.9	2.1	98.9
Voting issues	490	40.7	40.1	1.3	97.6
Board & committee independence issues	599	22.2	20.4	0.0	95.8
Other governance issues	1349	26.6	24.8	0.0	97.1
Sell the company	68	16.2	13.8	0.1	59.8
Non governance issues	13	3.6	4.1	0.8	6.1

Table 3: Companies with Shareholder Proposals that are Targeted and Acquired during 1996-2009

This table reports the number of proposals that are matched to a completed takeover bid on the date of takeover announcement and the number of companies receiving that much of proposals. This table is based on a one - many merge where one takeover bid can be matched to many proposals.

Year takeover is announced	Frequency of Proposals matched to takeover bid	Percent of total matched proposals	Number of Companies
1996	6	0.9%	4
1997	15	2.1%	3
1998	41	6%	11
1999	27	3.9%	15
2000	48	7%	16
2001	16	2.3%	9
2002	4	0.6%	2
2003	22	3.2%	9
2004	22	3.2%	8
2005	150	21.4%	25
2006	101	14.3%	33
2007	91	12.8%	31
2008	91	13%	19
2009	63	9.2%	16
Total	697		201

Table 4: Elapsed Time between Shareholder Proposal Date and Merger Announcement Date for Companies with Shareholder Proposals that are Targeted and Acquired

This table reports the difference in months between the shareholder proposals date and merger announcement date for shareholder proposals of companies that had complete takeover bids. Elapsed time is shareholder proposal date – merger announcement date. Shareholder proposal date is the date of the annual corporate governance review as reported by Georgeson Inc. Merger announcement date is the original date of announcement as reported by SDC.

Elapsed Time	Frequency of Proposals	Percent
< 0	93	13.3%
0-12 months	191	27.4%
12-24 months	101	14.5%
24-36 months	87	12.5%
36-48 months	72	10.3%
48-60 months	43	6.2%
> 60 months	110	15.8%
Total	697	100%

Table 5: Takeover Probability Estimation

This table reports the estimation results of the probability that a firm will become a takeover target, by estimating a probit model. We use the firm's characteristics as of the end of year t-1 and the observation of whether a firm becomes a target of a takeover attempt in year t to estimate the firm's takeover probability. The sample is from 1996-2009. The dependent variable TARGET is a dummy variable that equals one if the firm is a target of a successful takeover , and zero otherwise; PROPOSAL is a dummy variable that equals 1 if the company had at least one proposal in the sample period until one year before the takeover announcement and zero otherwise; VOTES_FOR is the mean of all votes in favor divided by all votes cast for shareholder proposals occurring until one year before the takeover announcement; PARTICIPATION is the mean of all votes cast divided by total voting power for shareholder proposals occurring until one year before the takeover announcement; SIZE is the log of total sales; TOBIN'S Q is the market to book ratio; PROFITABILITY is the net income before depreciation divided by average total equity; LEVERAGE is the book value of debt divided by the market value of assets; INDUSTRY is the proportion of firms with the same two-digit sic code and targeted in the same year divided by all COMPUSTAT S&P1500 firms targeted in the same year. Standard errors are included in parentheses. Economic significance is included in italics.

	(1)	(2)	(3)	(4)
PROPOSAL		0.135***		
		(0.049)		
		0.2842		
VOTES_FOR			0.244**	
			(0.112)	
			0.4734	
PARTICIPATION				0.164***
				(0.056)
				0.3184
SIZE	-0.077 ***	-0.083***	-0.082***	-0.085***
	(0.013)	(0.013)	(0.013)	(0.013)
TOBIN'S Q	-0.059 ***	-0.057***	-0.058***	-0.057***
	(0.016)	(0.016)	(0.016)	(0.016)
PROFITABILITY	0.109*	0.112**	0.109*	0.110*
	(0.057)	(0.057)	(0.057)	(0.057)
LEVERAGE	-0.842***	-0.880***	-0.863***	-0.889***
	(0.301)	(0.304)	(0.305)	(0.306)
INDUSTRY	0.825 ***	0.817***	0.821***	0.822***
	(0.139)	(0.139)	(0.139)	(0.139)
Constant	-1.030***	-1.003***	-1.001***	-0.990***
	(0.099)	(0.099)	(0.099)	(0.010)
N	18028	18028	17985	17985
N(TARGET)	946	946	945	945
Pseudo R^2	0.02	0.02	0.02	0.02
Prob > chi^2	0.000	0.000	0.000	0.000
Log Likelihood	-3643.79	-3640.12	-3635.26	-3633.38

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 6: Takeover Probability Estimation – Only Firms with Shareholder Proposals

This table reports the estimation results of the probability that a firm will become a takeover target, by estimating a probit model. We use the firm's characteristics and proposals characteristics as of the end of year t-1 and the observation of whether a firm becomes a target of a takeover attempt in year t to estimate the firm's takeover probability. The sample is from 1996-2009 and includes only firms with shareholder proposals. The dependent variable TARGET is a dummy variable that equals one if the firm is a target of a successful takeover, and zero otherwise; MULTIPLE is a dummy variable that equals 1 if the company has more than one proposal in the sample period until one year before the takeover announcement and zero otherwise; TAKEOVER-RELATED is a dummy variable the equals 1 if the company has at least one proposal that is related to repeal classified board, eliminate poison pill, eliminate supermajority requirement, cumulative voting and sell the company, and zero otherwise; RECENT is a dummy variable that equals 1 if the proposal is within a 3 year window before the announcement of the takeover , and zero otherwise; G-INDEX is the Gompers, Ishii and Metrick (2003) governance index as reported by Risk Metrics of the company at time t-1; WIN is a dummy variable that equals one when the VOTES_FOR for a company is above 50% and zero otherwise; LARGE_PARTICIPATION is a dummy variable that equals one when the PARTICIPATION is greater than 75% of the distribution of the sample and zero otherwise; all other variables are defined in Table 5. Standard errors are in parentheses. Economic significance is in italics.

	(1)	(2)	(3)	(4)	(5)	(6)
MULTIPLE	0.504***					
	(0.075)					
	1.34					
TAKEOVER RELATED		0.537***			0.520***	0.491***
		(0.073)			(0.082)	(0.076)
		1.42			*1.36*	*1.25*
RECENT			0.767***	1.031***		
			(0.080)	(0.272)		
			1.68	*1.40*		
WIN					0.049	
					(0.105)	
					1.00	
LARGE PARTICIPATION						0.227**
						(0.093)
						0.53
G-INDEX				0.050		
				(0.053)		
SIZE	-0.072 ***	-0.048*	-0.049*	-0.003	-0.047*	-0.044
	(0.029)	(0.029)	(0.029)	(0.088)	(0.029)	(0.029)
TOBIN'S Q	-0.111***	-0.094**	-0.091**	-0.478*	-0.094**	-0.092**
	(0.044)	(0.044)	(0.047)	(0.257)	(0.044)	(0.044)
PROFITABILITY	0.007	-0.012	0.049	-0.688	-0.012	-0.022
	(0.151)	(0.151)	(0.153)	(0.620)	(0.151)	(0.151)
LEVERAGE	-0.093	-0.093	-0.076	0.070	-0.079	-0.065
	(0.262)	(0.260)	(0.267)	(0.777)	(0.261)	(0.259)
INDUSTRY	0.822 ***	0.833***	0.736**	0.048	0.827***	0.852***
	(0.302)	(0.302)	(0.307)	(0.814)	(0.302)	(0.303)
Constant	-1.398***	-1.642***	-1.880***	-1.998**	-1.648***	-1.696***
	(0.240)	(0.242)	(0.253)	(0.942)	(0.242)	(0.243)
N	5742	5742	5742	451	5742	5742
N(event)	150	150	150	19	150	150
Pseudo R^2	0.05	0.05	0.09	0.18	0.05	0.06
Prob > chi^2	0.000	0.000	0.000	0.000	0.000	0.000
Log Likelihood	-662.76	-657.90	-631.62	-64.52	-657.80	-655.05

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 7: Shareholder Activism and Cumulative Abnormal Returns for Target Shareholders Surrounding Merger Announcement

This table contains the estimated coefficients for an OLS regression relating the cumulative abnormal return surrounding a merger announcement, the existence of shareholder proposals, the support from shareholders for the proposals, the participation of the shareholders in voting on a proposal, and the existence of shareholder proposal sponsors that have ownership in bidder firms. The cumulative abnormal return is calculated over the (-5, +5) window surrounding the merger announcement. PROPOSAL is a dummy variable that equals 1 if the company had at least one proposal in the sample period until one year before the takeover announcement and zero otherwise; VOTES_FOR is the mean of all votes in favor divided by all votes cast for shareholder proposals occurring until one year before the takeover announcement; PARTICIPATION is the mean of all votes cast divided by total voting power for shareholder proposals occurring until one year before the takeover announcement; RECENT is a dummy variable that equals 1 if the proposal is within a 3 year window before the announcement of the takeover , and zero otherwise; WIN is a dummy variable that equals one if VOTES_FOR a company is more than 50% and zero otherwise; LARGE_PARTICIPATION is a dummy variable that equals one if PARTICIPATION is greater than 75% of the distribution of the sample and zero otherwise; PUBLIC_US_BIDDER is a dummy variable that equals 1 if the bidder is a public US firm and zero otherwise; INFO_LINK(1)* PUBLIC_US_BIDDER is an interaction between INFO_LINK(1) which is a dummy variable that equals 1 if the shareholder proposal sponsor is an owner in the bidder and zero otherwise and PUBLIC_US_BIDDER; OWNERSHIP is a dummy variable that equals 1 is the bidder and the target have common owners and zero otherwise; and all other variables as previously defined. Standard errors are included in parentheses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PROPOSAL	-0.058**				-0.056*	-0.059*	-0.150
	(0.030)				(0.034)	(0.036)	(0.151)
VOTES_FOR		-0.152**					
		(0.068)					
PARTICIPATION			-0.064**				
			(0.033)				
RECENT				-0.053*			0.109
				(0.030)			(0.152)
WIN					-0.006		
					(0.060)		
LARGE_PARTICIPATION						0.003	
						(0.052)	
PUBLIC_US_BIDDER							-0.008
							(0.020)
INFO_LINK(1) *							-0.081
PUBLIC_US_BIDDER							(0.074)
OWNERSHIP							0.0001
							(0.010)

SIZE	-0.014**	-0.014**	-0.014*	-0.014**	-0.014*	-0.014*	-0.013*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
TOBIN'S Q	-0.033***	-0.033 ***	-0.033 ***	-0.033 ***	-0.033 ***	-0.033 ***	-0.031***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)
PROFITABILITY	0.001	0.001	0.001	0.001	0.001	0.001	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
CONSTANT	0.383***	0.383***	0.383***	0.383***	0.383***	0.383***	0.383***
	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)	(0.054)
N	749	749	749	749	749	749	749
Adjusted R^2	0.021	0.022	0.021	0.020	0.020	0.020	0.020
F	4.91	5.22	4.91	4.75	3.93	3.92	2.69

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Table 8: The Impact of Cross Holding on the Likelihood of Takeover

This table reports a Probit model which estimates the effect of having a shareholder proposal sponsor in a target firm as an owner in the acquirer, in addition to other firm and proposal characteristics as of the end of year t-1 on the probability that a firm will become a takeover target in year t. The sample is from 1996-2009 and includes only firms with shareholder proposals that were acquired by public US bidders. The dependent variable TARGET is a dummy variable that equals 1 if the firm is a target of a successful takeover, and zero otherwise; INFO_LINK (1) is a dummy variable that equal 1 if the shareholder proposal sponsor in the target firm is also an owner in the bidder firm and zero otherwise; INFO_LINK(2) is a dummy variable that equals 1 if the shareholder proposal sponsor is an owner in the bidder and is also an active shareholder proposal sponsor in the bidder and zero otherwise; COMMON_OWNERSHIP is a dummy variable that equals 1 if the target firm and bidder firm have any common owners and zero otherwise. All other variables are as previously defined. Standard errors are in parentheses.

	(1)	(2)	(3)	(4)	(5)
INFO_LINK (1)	1.73***	1.25***	0.91**	-0.38	1.70***
	(0.18)	(0.27)	(0.38)	(1.34)	(0.18)
TAKEOVER_RELATED		-0.04			
		(0.13)			
INFO_LINK(1)*		1.12***			
TAKEOVER-RELATED		(0.39)			
VOTES_FOR			0.14		
			(0.31)		
INFO_LINK(1)*			2.68***		
VOTES_FOR			(0.98)		
PARTICIPATION				0.84**	
				(0.38)	
INFO_LINK(1) *				2.87*	
PARTICIPATION				(1.53)	
INFO_LINK(2)					1.09***
					(0.25)
COMMON_OWNERSHIP	1.32***	1.32***	1.32***	1.27***	1.19***
	(0.23)	(0.23)	(0.23)	(0.23)	(0.24)
RECENT	0.63***	0.60***	0.51***	-0.19	0.57***
	(0.11)	(0.13)	(0.16)	(0.34)	(0.11)
SIZE	-0.04	-0.04	-0.04	-0.05	-0.05
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
TOBIN'S Q	-0.06	-0.06	-0.06	-0.05	-0.06
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
PROFITABILITY	0.18	0.18	0.14	0.17	0.16
	(0.19)	(0.20)	(0.20)	(0.20)	(0.20)
LEVERAGE	-0.14	-0.13	-0.11	-0.12	-0.03
	(0.40)	(0.40)	(0.40)	(0.40)	(0.39)
INDUSTRY	0.77**	0.80**	0.80**	0.88**	0.82**
	(0.37)	(0.37)	(0.37)	(0.38)	(0.37)
CONSTANT	-2.31***	-2.25***	-2.23***	-2.23***	-2.23***
	(0.35)	(0.35)	(0.36)	(0.36)	(0.35)
N	5153	5153	5119	5119	5153
N(event)	80	80	80	80	80
Pseudo R2	0.20	0.21	0.21	0.22	0.22
Prob > chi2	0.00	0.00	0.00	0.00	0.00
Log Likelihood	164.05	172.65	174.36	185.33	181.52

, **, * Denotes statistically significant at the 10%, 5%, and 1% levels, respectively.*

Appendix

Table A1: Shareholder Proposals by Type

1- Issues related to antitakeover devices:

Repeal classified board
Eliminate poison pill
Approve golden parachutes
Eliminate supermajority requirement
Opt-out of state antitakeover law
Prohibit greenmail payments
Targeted share placement
Fair price provision

2- Voting issues:

Cumulative
Confidential
Majority vote to elect directors

3- Board and committee independence issues:

Director ownership
Prohibit dual CEO/Chair
Increase board independence
Limit director terms
Nomination of directors
Director compensation
Director attendance at meetings
Other related to directors

4- Other Governance issues:

Executive compensation
Annual meeting
Restore preemptive rights
Audit-related
Restrict options
Equal access to proxy
Establish shareholder committee

5- Sell the Company

6- Other Non-Governance Issues

Table A2: Companies with Corporate-Governance-Oriented Shareholder Proposals

This table reports the number of shareholder proposals that S&P 1500 companies received over the 1996-2009 sample period as reported by Georgeson, Inc. Panel A reports the total number of corporate-governance-oriented proposals a company receives during the entire sample period and panel B reports the total numbers of proposals received during a one-year window.

Panel A: Frequency of proposals from 1996 to 2009

Number of proposals received over sample period	Number of companies receiving this many proposals	Total proposals received
1	295	295
2	118	236
3	77	231
4	42	168
5	43	215
6	34	204
7	20	140
8	15	120
9	10	90
10	17	170
11 to 15	38	492
above 15	47	1270
Total	755	3631

Panel B: Number of corporate governance proposals in any given year

Number of proposals in any given year	Number of companies	Total number of proposals
1	1446	1446
2	418	836
3	162	486
4	91	364
5	46	230
6	16	96
7	8	56
8	9	72
9	5	45
Total		3631

Table A3: Shareholder Proposals Submitted According to Proposal Type

This table presents the shareholder proposals submitted each year from 1996-2009 by proposal type. Each year's entry shows the total number (and percentage) of proposals from each proposal category for that year.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Anti-takeover devices	61	31	17	37	37	87	122	148	124	103	101	76	71	77	1092
%	*55%*	*38%*	*27%*	*42%*	*45%*	*36%*	*44%*	*34%*	*30%*	*27%*	*26%*	*20%*	*21%*	*21%*	*30%*
Voting Issues	6	4	4	6	6	24	28	20	39	78	111	59	43	66	494
%	*5%*	*5%*	*6%*	*7%*	*7%*	*10%*	*10%*	*5%*	*9%*	*21%*	*29%*	*16%*	*13%*	*18%*	*14%*
Board & Committee Independence Issues	39	24	20	16	15	51	61	51	69	50	74	57	43	34	604
%	*35%*	*29%*	*32%*	*18%*	*18%*	*21%*	*22%*	*12%*	*17%*	*13%*	*19%*	*15%*	*13%*	*9%*	*17%*
Other Governance Issues	4	10	17	25	16	59	65	213	179	139	98	180	168	185	1358
%	*4%*	*12%*	*27%*	*28%*	*19%*	*25%*	*23%*	*49%*	*43%*	*37%*	*25%*	*48%*	*50%*	*50%*	*37%*
Sell Company	1	13	4	4	9	19	2	2	3	5	1	1	3	2	69
%	*1%*	*16%*	*6%*	*5%*	*11%*	*8%*	*1%*	*0%*	*1%*	*1%*	*0%*	*0%*	*1%*	*1%*	*2%*
Non governance issues	0	0	0	0	0	0	0	0	0	0	0	0	10	4	14
%	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*3%*	*1%*	*0%*
Total	111	82	62	88	83	240	278	434	414	375	385	373	338	368	3631

Table A4: Proposals by Sponsor Type

This table reports the number (and percentage) of proposals submitted by the labor unions, pension funds, religious organizations, other shareholder groups, and individuals for each year in the sample.

Sponsor	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Labor Unions	40	30	27	44	30	40	74	206	178	157	148	151	105	118	**1,348**
%	36%	37%	44%	50%	36%	17%	27%	47%	43%	42%	38%	40%	31%	32%	37%
Public Pensions	9	6	11	11	12	10	18	9	14	16	19	19	18	26	**198**
%	8%	7%	18%	13%	14%	4%	6%	2%	3%	4%	5%	5%	5%	7%	5%
Religious Organizations	5	16	11	15	19	9	6	7	12	24	15	13	8	10	**170**
%	5%	20%	18%	17%	23%	4%	2%	2%	3%	6%	4%	3%	2%	3%	5%
Other Shareholder Groups	57	30	13	18	22	24	15	27	16	18	22	12	40	31	**345**
%	51%	37%	21%	20%	27%	10%	5%	6%	4%	5%	6%	3%	12%	8%	10%
Individuals	0	0	0	0	0	157	165	185	191	158	180	176	163	179	**1,554**
%	0%	0%	0%	0%	0%	65%	59%	43%	46%	42%	47%	47%	48%	49%	43%
Not Available	0	0	0	0	0	0	0	0	3	2	1	2	4	4	**16**
%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	1%	1%	1%	0%
Total	111	82	62	88	83	240	278	434	414	375	385	373	338	368	**3631**

V. CONCLUSION

In my first essay, studying a cross section of 3033 CEOs in 1964 different S&P 1500 firms, I show that attending an elite university for education, having work experience in a publicly listed firm, serving as a director on public and S&P 1500 boards, and being overall successful in the career path, helps the CEO gain more central position in the social network of all US executives and directors. This increased centrality translates on average into significantly higher market valuation, higher (but insignificant) accounting performance, and significantly higher CEO compensation. The results of this essay support the private information hypothesis; central CEOs can access and exchange information more easily and hence the CEOs leverage on those advantages in a positive manner.

However, in my second essay, I also show how the CEO network centrality can also be value destroying if the CEO exploits the power she gains from being central in the network to maximize her own wealth, and hence destroying shareholders value. By studying 464 S&P 1500 acquirers from the period 1999 to 2008, I find that higher CEO network centrality is associated with higher tendency to conduct value destroying acquisitions that not only creates losses to the acquirers but also reduces overall synergies. This evidence is consistent with the managerial entrenchment hypothesis; I show first that those bidders have extremely high centralities and they also self select themselves to conduct acquisitions although they are aware of the negative impacts of mergers on acquirer shareholders, moreover, I present evidence that those powerful CEOs can withstand the disciplining threat of market for corporate control, and the managerial labor market.

Finally, in my third essay, I show studying 755 S&P 1500 firms during the 1996-2009 periods, that shareholder activism, measured by receiving shareholder proposals, shareholders' support, and shareholders' participation in voting on those proposals, increases the probability of firm to get acquired by 30% on average. This increased probability of takeover can be explained by the signaling effect of shareholder proposals to the external market for corporate control. However, this increased likelihood in takeovers is accompanied by 6% less cumulative abnormal returns for the target's shareholders around the merger announcement, compared to firms not receiving shareholder proposals. The increase in takeover likelihood is the most in firms where shareholder sponsors are also owners in bidders, providing evidence that information still proves to be an important element impacting both internal and external governance.